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EDITORIAL NOTES.

With the remarkable successes in aerial navigation, comes the news that the Wright brothers are to begin suit against their rival, Curtiss, for infringement of patent. The **A VICTIM TO DUTY.** statement is of more than passing interest because it brings to mind the fact that not only fame and honor attend discoveries in the mechanic-arts, but great wealth as well. Mechanics furnishes every incentive to the investigator. How different is it in the field of medicine, where he who is not satisfied to follow in beaten paths receives but scant assistance in hewing out new trails. Even when his work is done—when some great and important discovery has crowned his efforts and his associates have been convinced of its utility and worth—his reward seems most meagre. The names of the navigators of the air are on every tongue, yet the men of the Army Medical Commission, who identified the stegomyia as the carrier of yellow fever, a discovery which has been one of the greatest boons to humanity, are known but to a few; Reed, Carroll, Lazear, Agaramonte—the value of their work will at some time be appreciated by an indifferent public. In medicine the reward must come from within; from a consciousness of work well done, of theories proved and facts demonstrated, and after all there can be no greater satisfaction than this.

In May of this year a Californian sacrificed his life in the pursuit of duty. Dr. William Martin Wightman of the United States Public Health and Marine Hospital Service died at Guayaquil, Ecuador, of yellow fever. Graduating from Cooper

Medical College in 1899 he served as an intern in the Marine Hospital for a year and later entered the service. He was a thorough and conscientious student and his genial disposition and excellent qualities won him a host of friends. He was engaged for a time in quarantine work in San Francisco and became a member of the County Medical Society. The qualities which had distinguished him as a student ripened with the years, and he became a competent and painstaking officer. His work was his life for his heart was in it and his details were done with that promptness and cheerfulness which characterize the physician of high ideals. He had a sterling character and his sunny temperament reflected on all who came within its sphere; his life was an inspiration to those who worked with him. It is strange that such a man, so much needed by his fellows, should be signaled out to die. He was a victim to duty; he gave his life to the cause of preventive medicine and added another name to the long list of heroes of his service. A self-absorbed public neither knows nor cares of Wightman's life or his ill-timed death. It is only in his own corps, among the men who so often place their lives at hazard in following the path of duty, that his name, his work and his character cannot be forgotten.

The work of the United States Public Health and Marine Hospital Service in uncovering and outlining the focus of

GROUND SQUIRRELS AND PLAGUE.

squirrel plague in California marks one of the greatest advances which

has been made by Preventive Medicine in the last decade. During recent years each summer has been marked by the occurrence of one or two human plague cases in Contra Costa or Alameda counties. It has been known for several years that an epizootic was spreading among the ground squirrels of that region, and it was suspected that this epizootic was bubonic plague and that the human cases received their infection from this source. This, however, was entirely a matter of conjecture until the summer of 1908, when four plague infected squirrels were found. Several officers of the Public Health Service had previously worked out the susceptibility of the ground squirrel to bubonic plague, but these were the first natural plague infected squirrels reported. Following up this lead Surgeon Rupert Blue began an active campaign in Contra Costa county in the spring of 1909. This has yielded results of the greatest importance from a scientific standpoint and has placed the pathology of natural plague among ground squirrels upon a solid basis. In fact, this phase of the work is as epoch-making as that of the British Commission in India with the rat. Thus far, infection has been found in almost every place in which men have been placed at work, a total of some two hundred odd infected squirrels having been found. These were not confined to Contra Costa county, but were also found in Alameda county where it may be remarked, en

passant, a human case directly traceable to squirrels has recently occurred. Interesting as all this is from a scientific standpoint, the question naturally arises as to what practical application is to be made of these discoveries. Primarily, it may be said that a focus for plague is being dealt with which, if allowed to continue, will stamp California as an endemic plague center, and it further appears that the squirrel is the animal in which the disease is kept alive to spread to rats and thence to man. The natural deduction is, therefore, that the ground squirrel must be eradicated. This means an extensive propaganda of education to the end that the individual ranch holder will lend his thorough co-operation. This has already been launched by Passed Assistant Surgeon W. C. Rucker, who is in charge of the field work, and bids fair to yield excellent results. An extensive article by him upon this subject appears in the Public Health Reports for August 27th and it should be read by every physician in California. There is no telling how far the infection has spread and what other counties in the state may be harboring the disease in rodent form. We must, therefore, be on the lookout for human or rodent cases and should report to the health authorities the occurrence of suspicious cases in our practice or a high death rate among ground squirrels.

The impression that glycosuria and diabetes are not "rare" or "uncommon," as stated in some text-books, has in recent years gained a strong hold on the minds of many physicians.

DIABETES IN NEW YORK CITY. While many statistics have been printed concerning the incidence of these conditions, the great variance of the figures have made it difficult to arrive at any accurate conception of the truth. So much so has this been the case that Naunyn, in his book on Diabetes, says that almost any figures desired can be selected from the various estimates, and that only out of courtesy to the authors does he quote any of them. For the most part such statistics are based on hospital and mortality records, and while useful in some directions, it must be realized that they give no information as to the actual incidence of either glycosuria or diabetes in the community at large, for many diabetics never enter a hospital and many die from other diseases.

The recent study of Ballinger (the Archives of Internal Medicine, May, 1909), however, throws some light on this interesting question. His conclusions are based on the records of one of New York's large insurance companies. Between the years 1902 and 1907, 71,729 adults were examined medically by this company. They belonged, naturally, to the better social class, which shows, as is generally recognized, a greater incidence of diabetes than does the poorer class of people. Probably 95% or more of them were men between the ages of 18 and 60, and of course they were practically all on a mixed diet (one containing carbohydrates). The number showing glucose on one or more examinations was 2,043 or 2,840 per 100,000. Of these 681 showed between 1 and 12 per cent, and 1362 less than 1

per cent of sugar. If we consider the presence of 1 or more per cent of sugar in an office specimen of urine, a criterion of the existence of diabetes, the incidence of diabetes per 100,000 of population would be 950. Such a criterion, however, is obviously a very arbitrary one, but not without some justification, as pointed out by Barringer. Experience has shown that persons having 1 per cent or more of sugar on an ordinary diet containing slight or moderate amounts of carbohydrates, are under strong suspicion and probably have diabetes. Moreover, Barringer and Roper have shown that of a group of twenty patients with slight glycosuria, nine or 45 per cent developed diabetes at the end of five years.

Figuring on the basis that 50 per cent of the 1362 cases with less than 1 per cent of sugar in the urine, Barringer finds a total of 1895 per 100,000 of population with diabetes. These figures are nothing short of startling when we consider the statistics of Osler, who says that among 99,000 patients admitted to the medical wards and medical dispensary of the Johns Hopkins Hospital, there were only 226 cases of diabetes or 228 per 100,000 of medical admissions; or the last mortality statistics by the United States Census Bureau, which show between 1901 and 1905 a yearly average of 11.6 deaths from diabetes per 100,000 of population.

From time to time the subject of post-operative lung complications is brought in review before the surgical world.

POST-OPERATIVE PULMONARY COMPLICATIONS.

During the past few months a number of noteworthy articles have appeared. Among these, the two most suggestive to the writer are those by Munro in our own land, and by Ranzi, of Vienna. The former deals exclusively with bronchitis and pneumonia, and the latter with lung conditions of an embolic nature. Both papers more or less clearly point the same moral, and that rather a different one from the time honored conception of post-operative chest complications.

It has been the habit for a long time for surgeons to shift the responsibility of these disconcerting contingencies to the shoulders of the anaesthetist. The irritative properties of ether are likewise accused of marring the results of operations that were expected to be successful. The complacent comfort of having these scapegoats of the surgical conscience, is being rudely torn from our all too short list of consoling excuses. The first threat that such an invasion of our vested rights was coming, was seen in the results of operations after local and spinal anaesthesia. As regards the subject at issue, the results were no whit better. Here was food for thought.

The answer to the puzzle seems to be pretty clearly worked out, and necessitates a shifting of the direction of the finger of accusation from the anaesthetist and anaesthetic, to the operator himself. It comes back, as so many other matters come back, to the subject of technic. In other words, with the exception of operations about the mouth and throat,

which involve the sensory or motor control of the upper organs of deglutition and respiration, and so allow a real aspiration pneumonia, the great majority of lung complications are of an embolic nature, and have their origin at the site of operation. The two great factors are wound infection, either gross or hidden, and trauma to veins. Both causes promote thrombosis and embolism, and the lung lesions referable to them may be single, as an infarct or abscess, or multiple, as a septic pneumonia, or multiple infarcts.

Certain operations necessitate the soiling with bacteria of large wound surfaces, such, for example, are those on the rectum and the laying of fecal fistulae. It is exactly these cases that in all hands are responsible for a strikingly large part of the lung complications. Then there is a group following so-called clean cases. In many of these, handling and tying of vessels is a feature, notably in pelvic work, and in the radical cures of hernias containing omentum. Here it is the custom of many operators to seize large masses of tissue in strong forceps, and to tie in bunches with strong catgut. How common it is for the operator to complain bitterly of the weakness of the catgut. Such a disposition of ligatures leads surely to a much more extensive formation of thrombus than necessary and invites embolism.

Years ago, one of our older American surgeons, attacked the problem in his clinic by introducing as a ligature for all clean cases, a fine silk tie that would break at a given low tension. By means of this strategy, he compelled his assistants to pick up small bits of tissue, and to isolate the individual vessels to be tied. Also the silk knot tied in this way was so small as to offer little foreign material, and could not serve as a culture medium for stray bacteria which might settle exactly at the mouth of a vessel, and infect the thrombus formed by the ligature. This method, however, has found many more critics than imitators, on account of its requiring more pains in its execution. It is at least interesting in connection with our subject.

But after all, the most important single demand is for an aseptic technic, for it is wound infection that precedes most lung complications and thromboses. Even when a wound heals per primam, we can conceive of infection, potent enough to attack thrombi in the ends of cut veins, and yet not virulent enough to cause breaking down of a wound in the presence of the juices of the more resistant tissues. Many surgeons who have an otherwise good technic, expose a large skin area around the wound. This is merely one of the negligences that invite wound infection.

It is superfluous to say that we should consistently and patiently struggle to eliminate every source of danger to our patient. Is it possible that some day the occurrence of post-operative lung complications may accuse the operator just as the occurrence of puerperal fever accuses the obstetrician to-day?

Under the name of "Hysterical Paroxysmal Oedema," Edgeworth has recently described (The

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HYSTERICAL of Medicine, 1909,
PAROXYSMAL OEDEMA. No. 2) some inter-

esting cases of angio-neurotic oedema, characterized by the repeated occurrence of transitory oedema affecting "geometrical" or "segmental" areas of the body-surface, associated in some instances with disturbances of sensation, hysterical in type. These cases present the features of a sub-cutaneous oedema of fairly sudden onset, raising the surface of the skin from one-quarter to three-quarters of an inch above its ordinary level. The whole area becomes affected at the same time—the oedema is not a spreading one. The surface of the skin is generally natural in color, but in some cases hyperæmic, or white, or purplish. The oedema is firm and non-pitting when at its height; during its subsidence it becomes softer. No bullæ are formed on the skin and blebs are rare. The oedematous area is almost invariably sharply marked off from the adjacent normal surface by an abrupt edge.

The occurrence of the oedema generally causes no pain, although in some cases there is a sensation of itching or burning at the beginning of the attack. The duration of each attack varies from a few hours to several days and occasionally lasts several weeks. The areas affected by the oedema are not supplied by any branch or branches of the cranial or spinal nerves nor by those supplied by cranial or spinal nerve-roots (segmental areas of Thornburn, Head and Sherrington). They correspond with natural divisions of the body, e. g., mamma; or with areas covered by articles of clothing, e. g., stocking, sock, glove—that is, with the areas called "geometrical" or "segmental" by writers on hysterical phenomena. In some cases disturbances of sensation—partial or complete loss of sensibility to touch, painful or thermic stimuli—co-existed with the attacks of the oedema. These disturbances are evidently not due to the mechanical effects of the oedema, since the area of distribution never corresponded exactly to that of the oedematous swelling. The areas over which this loss of sensibility occurred were also of the "geometrical" type, though differing from those of the oedema in their greater extent. In other cases the fields of vision are contracted.

The peculiar distribution of the oedema in this group of cases, and its association, in some, with disturbances of sensibility, suggested that it was of hysterical origin. This conclusion is supported by comparison with the hysterical chronic oedema first described by Sydenham in 1682, and subsequently by Charcot and his pupils. This affection is rarely found as an isolated phenomenon; it is generally superimposed on some other hysterical manifestation, such as arthralgia, paralysis, or contracture. It is of variable aspect, and affects the whole circumference of the involved part. It is generally accompanied by disturbances of sensibility, which are apt to take the form of hyperæsthesia in arthralgias, anaesthesia and thermo-anæsthesia when superimposed on a paralysis or contracture.

ORIGINAL ARTICLES

THE PREDISPOSING CAUSE OF CHRONIC SUPPURATIVE OTITIS MEDIA.*

By G. P. WINTERMUTE, M. D., Oakland.

I would divide the subject which has been assigned me in this symposium, into two divisions: the first being the predisposing cause of the acute otitis media, which usually precedes the chronic; and the second being those factors which tend to cause an acute otitis to become chronic.

The direct cause of the acute cases is an infection by the pus producing organisms, which meets a locus of low resistance in the middle ear, overwhelms it and sets up a suppurative process. The indirect causes are those conditions which tend to lower the resistance of the parts. Under these indirect causes we may consider climatic conditions, nasal conditions, and the condition of the middle ear itself.

All aurists are familiar with the fact that during seasons of pronounced climatic change, particularly a season of cold, damp weather, their cases of suppurative otitis media increase in number. The climatic effect is one of reducing the resistance of the body generally to those infections which may produce the ear trouble in acute cases, or result in an exacerbation in a slumbering, but unhealed, chronic case. So, too, a draft of cold air blowing upon the ears and neck of a patient who is resting while perspiring, without proper protection, may lead to the same result through sudden vaso-motor disturbance of the parts, causing a secretory form of inflammation of the mucous membrane, which, with the access of pus organisms, may lead to a suppurative form; or furnish the best conditions, in the slumbering cases, for the renewed propagation and activity of the resident microbes. In just such proportion as males are more exposed to the inclemencies of the weather than females, do we find our preponderance of cases among men.

As another contributing factor we have nasal obstructions. Enlarged turbinates, spurs, deflections of the septum or polyps, if they obstruct one or both nares, tend to form a partial vacuum in the naso-pharynx, and indirectly in the Eustachian tube and middle ear, with each inspiration of air. This rarefaction of air induces a chronic engorgement of the parts, and forms a contributing factor towards lessened resistance in the event of infection occurring.

Under conditions of the middle ear itself favoring suppuration, we have the secretory benign form of inflammation, which if existent, renders the parts an easy prey to invading suppurative bacteria. We also have in the new born, the tympanum filled with a mass of gelatinous embryonic tissue, similar to Wharton's jelly, which offers an especially favorable soil for germ growth, and accounts for the cases of suppurative otitis media which occur directly after birth.

We have two great paths for the travel of infection to the ear: the first is by direct extension of the

process from the naso-pharynx through the Eustachian tube; the second is through the lymphatics—particularly from the tonsils and pharynx. To my mind the latter is the more frequent route for the bacterial invasion. We also have, far more rarely, direct extension of a diffuse external otitis through the Rivinian segment; and infection occurring through a traumatic rupture of the membrana tympani. All forms of rhinitis contribute directly or indirectly to an infection taking place. Personally I believe that direct extension through the tube is not as frequent as was formerly supposed. That suppurative otitis media is often coincident with the various forms of rhinitis is evident to all otologists, and that infection occurs by direct extension sometimes is also evident, but it is my belief that the usual cause lies in interference with drainage which the nasal inflammations cause by engorgement of the tube, blocking of its lumen, and destroying its cilia cells, causing a retention of the middle ear secretions, which then become infected through the channel of the lymphatics. Direct infection can take place in improper douching of the nose in suppurative sinus conditions, whereby the douching liquid carrying infecting material is forced into the middle ear cavity. So, too, coughing, vomiting and sneezing may force a suppurative nasal discharge similarly into the tympanum; and post nasal tampons are great sources of danger when used to prevent blood entering the pharynx in operating under general anesthesia on pus producing nasal conditions, because they sometimes excite violent attacks of sneezing. Dirty Eustachian catheters and bougies may be set down as occasional causes.

Adenoids play a three-role part. Infection may take place primarily in them, and through the lymphatics reach the middle ear; as adenoids are usually accompanied by inflammatory condition of the naso-pharynx it has its indirect effect; and finally if their bulk is so great that it encroaches upon the tube they mechanically interfere with drainage.

The role the tonsil plays in middle ear infections is only recently becoming recognized. It is undoubtedly a very important channel of infection. Tonsillitis, acute otitis media and enlarged glands of the neck is a clinical sequence so frequently seen that it is cause for wonder that the relationship was not pointed out years ago. When we remember that the lymphatic channels of the ear freely anastomose with the submucous lymphatic system of the pharynx and tonsils, and also with the superficial lymphatic glands between the platysma and the sterno-cleidomastoid muscles, we can readily account for this mode of infection and this common clinical picture. Not only acute tonsillitis, but hypertrophied tonsils and tonsils with chronic lacunar inflammation, being abnormal tonsils which offer a feeble barrier of resistance to infections, may certainly be put down as a predisposing cause of otitis media; and degenerate fibrous tonsils from their tension and dragging through the pillars upon the tensor palati muscles, which control the patency of the tube, act as an indirect cause as well.

The exanthematous diseases are responsible for

* Read at the Thirty-ninth Annual Meeting of the State Society, San Jose, April, 1909.

many cases. Twenty per cent of scarlet fever cases develop a suppurative otitis media; and as the scarlet fever cases are noted for their bone destruction, they are the most apt to become chronic. Measles is complicated similarly in five per cent of the cases and diphtheria shows about the same average.

Cases of general streptococcus infection are very apt to find a point of low resistance in the ear, and both whooping cough and influenza contribute cases. In measles, streptococcus infection and influenza, the complication occurs early. In measles the characteristic macules have been observed upon the drum coincidently with their appearance in the mouth and naso-pharynx, which points to the toxins being carried to the ear by the general hematogenous infection. In scarlet fever the ear infection is late, occurring about the time of a post scarlatinal nephritis, which may have a similar mode of origin.

Coming now to the predisposing cause of the chronic cases we must first consider the tubercular cases, which might be described as chronic from the onset. These cases come on without any of the acute symptoms of pain, swelling or noticeable fever, so that the patient can scarcely give the history of the onset, and may properly be termed chronic throughout their course.

Under the factors which tend to cause the acute cases to become chronic we must consider treatment, bone necrosis, cholesteatoma and resistance. Proper treatment is important for two reasons: to secure as cleanly a field as is possible and to secure good drainage. It is a well known fact that the bacteria which are present at the onset of an acute suppurative otitis differ from those present in the chronic cases. In cultures made from acute cases at the time of the rupture of the membrana tympani, or paracentesis, pure cultures are usually found: the pneumococcus most frequently, followed by the streptococcus and seldom the staphylococcus. Mixed infection takes place in the chronic cases; pure cultures are rare, and the primary bacteria give way to the secondary. The staphylococcus is the common microbe of the chronic cases, with diplococci, bacillus proteus vulgaris, gonococci, bacillus fetidus, coli, Klebs-Læffler and leptothrix following about in frequency of the order named with the fungi aspergillus niger and yeast occasionally met with. With the advent of these hardier germs, the more virulent but less resistant pneumococci and streptococci die out. Conditions which favor the mixed infection taking place through the external auditory canal or the Eustachian tube are predisposing causes of the chronic condition, and treatment which renders these pathways clean favors the healing of the acute cases. Likewise if good drainage through the external canal and the tube is not present conditions are set up which favor a protracted course for an acute condition.

In those cases where the invading microbe is virile, resistance being low, and bone necrosis ensues, the character and extent of the lesion favors a more protracted course of the condition. Likewise if the suppurative discharge irritates the epithelium on the membrana tympani to the point of ex-

citing its growth through the perforation into the tympanic cavity, forming a cholesteatoma, we have another potent cause for the condition becoming chronic.

And, finally, we have those cases where the treatment has been good, but which nevertheless pursue a chronic course, attributable only to the low resistance of the individual—a known lack of resistance which so frequently expresses itself in diabetes and syphilis; and an unknown lack of resistance, which has its counterpart in successive outbreaks of furunculosis in some patients, which is paralleled occasionally by the apparent inability of the body organism to overcome the middle ear infection.

CEREBRAL COMPLICATIONS OF MIDDLE EAR SUPPURATION.*

By LOUIS C. DEANE, M. D., San Francisco.

After accepting for presentation at this meeting, the subject of this paper, I was struck with the difficulty of my task, for ten minutes is entirely inadequate to more than lightly touch upon a few salient points. I was encouraged to proceed only with the thought that many of these complicated and obscure cases come first to the notice of the general practitioner. It is to his prompt and ready recognition of an involvement of the cerebral tissues that frequently saves the life of the patient. So much depends upon the first visits of the physician. Though he can hardly be called upon to treat such a case, for the subject is so complex that even to one who makes a study of its intricacies it is often bewildering, yet a knowledge and appreciation of the chain of symptoms that associate themselves with a cerebral invasion is most important.

The brain and its workings are still and always will be a source of conjecture. It is in this organ that lies the inherent power of all our functions from simple muscular action and active manifestations of our senses to such complicated and unsolved functions as memory and reason. Many of the motor and sensory centers have been located within certain circumscribed areas but our knowledge concerning the action of other areas becomes confused as we consider the more complex psychological functions.

It is again a subject of interest, the remarkable manner that nature has protected the brain from external injury. Aside from the circulation, only through one or two routes can it be encroached upon by disease. The physical manifestations of disease and the methods used for its eradication are another source of wonderment. Its effect upon an organ apparently so delicate and vital yet so resistant that abscesses containing several ounces of pus and tumors the size of a hen's egg can exist, with indications so slight as to pass unnoticed, until by pressure or liberation of an infected focus we have evidences of a lesion of considerable extent. If the lesion is located within the motor or sensory areas something can be learned of its situation; but un-

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fortunately an array of diagnostic symptoms is the exception rather than the rule.

The ear, though not directly connected with the cranial cavity, can become so when involved with suppurative disease. Like other nasal sinuses it has by nature been well protected from traumatism by its deep situation. It occupies the larger part of the petrous portion of the temporal bone jutting boldly into the cranial cavity with only the thinnest lamella of bone as an inner covering. By its own prominence it separates the middle from the posterior cranial fossæ.

While thus being protected from external injury the ear forms a peculiarly favorable spot, with its numerous ramifications, for harboring an infection. Its connection through the Eustachian tube with the pharynx and nasal cavities gives it an ideal position to receive and lodge within its confines pathogenic material.

The means by which the meninges, brain tissue and venous sinuses are involved, by the ear, is of considerable interest. Its bony covering becoming carious would allow the meninges to come in direct contact with an infected area. The most likely spot for this to occur is through the roof of the middle ear, the roof of the antrum and its posterior wall, the latter being in more direct contact with the sigmoid sinus and cerebellum. These points are particularly susceptible because of the extreme thinness of the bone and virulence of the pathogenic changes which go on in contact with them.

Another means by which the cerebral contents might be involved is through the intermediary of little veins which pierce the bone and connect directly the sigmoid sinus and dura with the mastoid cells, also the mastoid emissary vein sometimes comes in direct contact with these cells.

A third means by which the cranial contents may be involved is through the labyrinth which has become infected, from the middle ear, through the round and oval windows or by caries of the wall of the horizontal semi-circular canal. It is not necessary for the labyrinthian walls to break down for through the aqueductus vestibuli the endo-lymphatic space is directly connected with the dura which divides into two leaves at this point. The presence of pus can form a sac here which could break outward forming an epidural abscess or inwards causing a diffuse leptomeningitis. The labyrinth is also connected directly with the subarachnoid space through the meatus auditorius internus and aqueductus cochlearis. This channel of infection may be accountable for the deep cerebellar abscess in contradistinction to the infection which breaks through the posterior wall of the antrum producing lesions more anterior and superficial.

The resistance of the dura to pyogenic processes is marked, for it is very frequent that a previously unsuspected pachymeningitis is revealed during the course of a mastoid operation. It may have existed for a long period with no tendency to extend. The most favored seat in chronic otitis media, for this condition to exist, is in the region of the tegmen tympani. This chronic inflammation of the dura

soon attempts to localize itself by forming inflammatory adhesions with the bone and later may form into a circumscribed pus cavity. If the adhesions are not sufficient to contain the pus and withstand its pressure it will gravitate posteriorly into the posterior fossa or anteriorly into the middle fossa and thus an epidural abscess exists at some distance from the seat of original infection.

The symptoms of an epidural abscess may be marked with signs of cerebral pressure and general infection or they may be so mild as merely to give evidence of an aggravated mastoiditis.

A pachymeningitis may involve the brain proper forming a focus of pus within the cerebrum or cerebellum. Locally the arachnoid space becomes obliterated by adhesions and the dura, arachnoid, pia and cortex are bound together. The lymphatic sheaths of numerous small bloodvessels which traverse the cortex at right angles to its surface connect directly with the subarachnoid space, and so the infected matter easily traverses the cortex and forms a focus some distance from the surface or in the white matter. It is interesting to note that frequently brain abscess can be of considerable size and yet not involve the brain tissue nearly as much as one would imagine. A brain abscess may be very chronic, slow growing and thoroughly encapsulated. The original line of communication through the cortex may become obliterated, leaving it practically unaffected. Thus the abscess, gradually increasing in size, would push aside the tissues rather than destroy them, exerting only pressure, likely on the internal capsule. This view is supported by the fact that when the abscess is drained the paralysis and other effects of pressure will immediately subside.

The most common situation for an abscess is in the temporo-sphenoidal lobe immediately above the tegmen tympani or in the lateral lobe of the cerebellum, the latter emanating from the posterior wall of the antrum and mastoid cells.

An involvement of the venous sinus adjacent to the ear is not of rare occurrence. The sigmoid sinus extending from the knee to the jugular bulb is the usual site. This sinus is of such size that it encroaches, seeming to push itself directly into the mastoid. The bone separating it from the cells is thin and easily breaks down, the dura first becoming inflamed, then the walls of the blood vessel, resulting in a phlebitis and thrombosis.

A number of cases of cerebral involvement might be quoted and each teach its lesson, though in studying such cases they become confusing in their lack of characterizing symptoms.

A case comes under our notice and by one or more symptoms our attention is drawn to the cerebral cavity as possibly being involved. Either those of pressure, toxic infection, or a symptom which shows that the function of some area has become impaired. If of pressure, the following symptoms may be present: reduced pulse rate and temperature, pain in head, nausea, vomiting, vertigo, physical depression, lethargy, convulsions and choked disc or optic neuritis.

The symptoms of toxic infection are those of septicemia, such as chill, great and rapid variations of temperature, high polynuclear count, profound pallor and the presence in the blood of a pathogenic organism as seen most characteristically in a thrombosis of one of the venous sinuses of the brain. All these symptoms can easily be confused or associated with the symptoms of a purulent meningitis (epidural abscess) or serous meningitis. Again these symptoms may be associated with the effects of cerebral pressure. The symptoms of abscess of the brain are those of brain pressure primarily. At the beginning the temperature may rise but soon drops to normal or subnormal, remaining so until rupture, when the abatement of the pressure and absorption of toxins cause the temperature to rise.

As to location of a brain abscess. If the function of some motor or sensory area is deranged we are always justified in locating the pressure at or near that area. For instance, in a lesion of the third frontal convolution on the left side we find agraphia and alexia. In lesions of the first temporal convolution on the left side we may have word deafness, crossed deafness and anosmia; of the occipital lobe, optic aphasia and hemianopia. If the lesion is about the fissure of Rolando, epileptiform convulsions and crossed paralysis of the extremities and facial paralysis.

If pressure is exerted in the cerebellum we may have ataxia, vertigo, staggering gait, nystagmus, emaciation and rigidity of the muscles of the neck associated with vomiting, prostration, pain locally on percussion, flexed limbs and upturned face.

It is not unusual that all these symptoms may be absent and yet the cerebellum harbor an abscess of considerable size. The obscurity of cerebellar abscess can well be judged when it is stated on authority that the vast majority of cerebellar abscesses are first revealed by post mortem examination. An abscess of the temporo-sphenoidal lobe may or may not give rise to localizing symptoms. They may largely be dependent upon an associated meningitis or an extension of the abscess cavity.

Time does not permit of my entering into an analytical consideration of the diagnostic value of cerebral symptoms but I cannot close without a word regarding lumbar puncture as a valuable means of diagnosis as well as of treatment. It gives us a clue as to the nature of the intra-cranial effusion and bacterial and purulent invasion of the meninges are here clearly shown in the cerebro-spinal fluid. Lumbar puncture also acts as a means of relieving intra-cranial pressure which in a serous meningitis may lead on to recovery.

In times past the mortality of pyogenic invasion of the intra-cranial cavity must have been complete. While it is yet high the cures that have been enacted by our modern methods of brain surgery are most encouraging. Be it said that it is to surgical methods alone that we may look for a cure in such cases and to one whose experience and knowledge of this vital region renders him capable of being conservative as well as radical in reaching the ultimate limits of the affection.

EYE SYMPTOMS IN INTRACRANIAL COMPLICATIONS FOLLOWING MIDDLE EAR SUPPURATION.*

By VARD H. HULEN, A. M., M. D., San Francisco.

The above subject allotted to me in this symposium if followed fully and to its logical conclusions would result in hundreds of pages, hence I shall only be able in my few moments to allude to the important eye changes often revealed and to the necessity of ocular examinations in these serious cases. It is hoped this supplement, as it were, to the broader subject of symptomatology treated here by another member, may be justified.

The eye symptoms which may be found are: anomaly of pupils, paralysis of ocular muscles, edema and palsies of lids, displacement of globe, diminished central vision, limitation of the fields, photophobia, lacrimation, and nystagmus. The ophthalmoscope may show a hyperemia of disc, an inflammation of the optic nerve, choked disc, engorgement and tortuosity of the retinal vessels, hemorrhages and edema of retina. Any, many or none of these ocular symptoms may appear in the dozen or more intracranial complications following middle ear suppuration. The absence of eye symptoms is not significant nor, unfortunately, is their presence necessary for a conclusive diagnosis. There is nothing characteristic, I need hardly say, in the occurring eye symptoms to determine otitic origin. For instance we cannot with the ophthalmoscope distinguish an optic neuritis of syphilitic cause from one produced by secondary meningitis, but the ophthalmoscopic picture or the special eye symptoms noted added to the other knowable facts may bring the aural surgeon to a positive conclusion. Thrombosis of the cavernous sinus gives the most extensive eye lesions such as edema of lids, ptosis, paralytic squint, exophthalmos, chemosis, choked disc, retinal hemorrhages, defective vision, etc., and yet all of these cannot be called helpful in making this diagnosis. But should such symptoms shift from one eye to the other a differentiation would be made from a primary orbital inflammation. In a possible meningitis, brain abscess, etc., fundus changes even slight may be of decided value in determining the advent of a complication.

Eye Grounds. While the ophthalmoscopic changes are not confined to the optic disc still the helpful symptoms are principally observed in the changes of the papilla and neighboring retina and blood vessels. The significant lesions in the disc vary from slight hyperemia to extensive papillitis with an elevation of several diopters. While the mirror will not enable us to differentiate the intracranial complications in otitic infections, partly because the cranial lesions may overlap thus changing the ophthalmoscopic picture, still we think of a meningitis when an optic neuritis is present and an intracranial abscess with papillitis. Changes in the nerve head are frequent in cerebral abscesses though less so than in tumors of the brain. The neuritis is usually not intense as it is a comparatively late symptom and the inflammation of the nerve may

* Read at the Thirty-ninth Annual Meeting of the State Society, San Jose, April, 1909.

even increase after the evacuation of the pus; in any case this symptom remains for six or eight months or more. If the abscess is of rapid formation there will probably not have been time for any fundus changes at all; this may also be the case with small abscesses. Optic neuritis may be found in abscesses situated in the frontal and temporo-sphenoidal lobes as also in the cerebellum. It may be that the neuritis is no more marked on the side of the abscess; in fact it may be greater in the eye of the opposite side.

It must be remembered that optic neuritis is said to have accompanied suppuration of the tympanic cavity.

Thrombosis of the retinal veins may be seen in thrombosis of the intracranial sinuses. McKernon reports that intraocular changes are found in about one-third of the cases of thrombosis of the sigmoid sinus.

It does not, for lack of time, seem advisable to attempt here a description of the ophthalmoscopic appearances in the various complications under discussion.

Central Vision. When considering the acuity of vision it is important not to be misled; to remember that the imperfect vision may be due to a considerable error of refraction. It is never safe to judge of the significance of diminished sight when recording uncorrected vision, or to forget the possibility of abnormal media in no way due to the disease in question. Nor can one at all judge the acuity of vision from the appearance of the eye-ground; there may appear to be a normal fundus or very slight ophthalmoscopic changes and yet greatly diminished vision is present; on the other hand the mirror may show tremendous changes, as an enormous choked disc, and practically normal vision.

Fields of Vision. When possible it is important to take the fields as hemianopsia has sometimes been noted in cerebral abscess.

Pupils. Any abnormality of the pupils is most significant of intracranial complications, and in brain abscesses an important localizing symptom. When the abscess is small and produces cerebral irritation the pupil on affected side may be contracted and sluggish in reacting to light and accommodation. If the abscess is in the temporo-sphenoidal lobe or frontal lobe the pupil on same side may be either contracted or dilated with a degree of stability. In general meningitis as a rule both pupils are equally affected, at first contracted, later dilated and fixed. Thrombosis of none of the sinuses except that of the cavernous affects the pupils as a rule. Two advanced cases of cerebellar abscess reported by Mac-ewen gave wide pupils (blindness). Pressure in cerebellar fossa gives pin-head pupils.

Ocular Muscles. Cerebral abscess may produce third nerve paralysis on same side which will recover on removal of the pressure, leptomeningitis implicates the cranial nerve in a more general and erratic manner than brain abscess. In advanced cases of abscess of the cerebellum ocular paralyses have been noted.

Nystagmus. Some of the results from the study of this extremely important eye phenomenon of otitic origin have lately been reported. McKernon stated in his paper at the A. M. A., 1908, that nystagmus is frequent in meningitis serosa which is not an infrequent extension from extensive mastoid and sinus involvement. Recent articles by Jansen and Barany are of the greatest interest and value and I cannot close this synopsis of eye symptoms in intracranial complications following middle ear suppuration more fittingly than with this quotation from Barany in *Annals of Oatology*, December, 1907.

"Not only for the diagnosis and treatment of labyrinth suppuration is the consideration of nystagmus very important but also for the diagnosis of cerebellar abscess and cerebellar tumor, or tumor of the nervous acousticus. The nystagmus in these cases is produced by irritation or paralysis of the nervus vestibularis or of the nucleus in the medulla oblongata or of Deiters' nucleus. The diagnosis of cerebellar abscess in middle ear suppuration is very difficult, and I have seen some cases where the nystagmus alone has helped us to the diagnosis with resulting operation and cure of the patient. Most cerebellar abscesses are caused by an old labyrinth suppuration, and in these cases the diagnosis is relatively easy. If one has to deal with a chronic middle ear suppuration without fever, with deafness, and no reaction to cold water, and this patient has strong spontaneous rotary nystagmus to the diseased side, the diagnosis of cerebellar abscess can be made at once and for the following reasons: If the patient does not react to the syringing with cold water, the labyrinth must be destroyed and he can have spontaneous nystagmus to the sound side or no nystagmus. Spontaneous rotary nystagmus to the diseased side proves that this nystagmus is produced by an intracranial complication in the posterior fossa of the skull, and as there is no fever and no meningitis there must be a cerebellar abscess."

THE TREATMENT OF CHRONIC SUPPURATION OF THE MIDDLE EAR.*

By M. W. FREDRICK, M. D., San Francisco.

The best way of treating chronic otitis media purulenta is by preventing it. Although this point has been insisted on many times, I do not think it amiss to bring it up again. The general practitioner, who sees most of the cases of acute otitis media, should be taught the importance of recognizing the condition and of bringing it to a speedy termination. He should have the value of an early and well-placed paracentesis of the drum-membrane impressed upon him, and the seriousness of a neglected case of middle-ear inflammation should be repeatedly pictured to him. Generally speaking, there are few conditions which are more grateful for a little attention of the right kind than an acute otitis media. The general practitioner, is, however, as a rule, wholly unfamiliar with the appearance of the tympanum in disease, and relies for the

* Read at the Thirty-ninth Annual Meeting of the State Society, San Jose, April, 1909.

treatment of his ear cases on two or three old recipes, usually boric acid, atropin and cocaine, or, worse yet, hydrogen peroxid. When the pain in otitis media acuta has subsided, no further attention is paid to the remaining otorrhea in many cases. In fact, the old fable that a chronic aural discharge acts as a sort of safety valve for the rest of the organism is, like Banquo's ghost, hard to down. To this popular delusion and to the indifference of many patients towards anything which does not cause them physical discomfort we are indebted for a large number of the cases which have proceeded to grave involvement of the bone before treatment is sought. Another thing which causes some observing patients to look with distrust on any attempt to check the aural discharge is the fact that many of them hear better when the discharge is active.

In approaching the subject, the first question that presents itself is: when is a case of middle ear suppuration to be considered as chronic? The periods of time stated in this regard are most arbitrary. Some authors give two months, others eight months, others a year and over. Others again make the answer depend on the amount of treatment received, and this seems to me to be the more logical way. I would hesitate to class an otorrhea as chronic that has persisted over a longer period of time through sheer neglect, and yields, as we often see it, to a few treatments.

Here, as elsewhere, too much importance can not be put upon an exact diagnosis. It is not always easy to make an exact diagnosis at the first visit; some time may have to be spent on cleansing, reducing acute exacerbations, and removing products of inflammation before one can obtain a clear picture. In 10% of the chronic cases there are polypi and granulations springing from the edge of the perforation. In other cases we have the same formations arising from the wall of the canal or the mucosa of the middle ear and these should be removed. While many favor caustics and the actual cautery for this work, others prefer the snare and the curette, claiming that caustics, especially the much-used chromic acid, is a source of much danger because one cannot gauge the depth of its penetration, and that much harm to the inner ear may result from its use. When the inflammation products are situated on the promontory one has to use great caution whichever agent he works with. When proper cleanliness and drainage are provided these excrescences will often take care of themselves.

The first and most important thing to note towards a diagnosis is the position of the perforation. Ballenger, in his recent work, gives an excellent diagram, and B. A. Randall, in the Transactions of the Otological Section of our A. M. A. for 1898, gives the statistics of the various positions of the perforations in 1,000 cases, and shows that the majority of the perforations are central. Ruppert, in an excellent article published in the *Munchener Medicinische Wochenschrift* No. 21, 1908, gives us the results of some carefully compiled statistics which show that in 55% the perforations were central. This places these cases in the column of

those that should be treated medically, or, at least, be given a prolonged medical treatment before surgical measures are resorted to. Even when the probe, which is not used as much as it deserves to be, shows roughened bone, patience will often accomplish wonders. Many of our otologists to-day are so enthusiastic about operating that they seem to recognize surgical measures only, and swell their statistics of successes by including a number of cases which could have been brought to a complete cure by milder measures, which would have insured the patients far better functional results without danger to life and the horrors which always attend operative procedures in the lay mind. While various operators report improvement in hearing in a number of cases their results do not compare with the number of cases in which hearing was improved when the suppuration was checked by medical means, and a *restitutio in form*, if not in tissue elements, of the drum membrane was obtained. In dismissing a case on which a mastoid operation has been performed and the drum cavity has become epidermatized, the operator is obliged to instruct the patient that he must return at intervals to have his ear inspected; if the drum membrane has been reformed such caution is unnecessary.

In those instances in which the discharge is maintained by some constitutional fault, such as chronic nephritis, diabetes, syphilis, tuberculosis, etc., we cannot hope to obtain much improvement unless the underlying fault can be corrected, and our aim should be to maintain cleanliness and drainage as much as possible while striving to correct the underlying dyscrasia. To operate under these conditions would be an error. The nature of the secretion is somewhat of a guide; if it is muco-purulent, without pronounced odor, the disease is probably confined to the mucosa, and will respond readily to medical treatment; if, on the other hand, it is thin and contains bone sand, or is fetid and inspissated, caries and retention are probably present, and the need of surgical interference becomes more likely.

Having obtained a picture of the drum and the tympanic cavity, and made a probable diagnosis of the condition of the accessory cavities, the next thing to do is to ascertain the condition of the Eustachian tube. This is often neglected by the continental aurists, judging by their writings, but is given a fair amount of attention in this country. The lack of attention given to this part will often explain why a discharge will persist even after a radical operation. W. S. Bryant has described in several articles the excellent results he has obtained by treating the Eustachian tube, especially at its pharyngeal end. The great number of centrally placed perforations show that the majority of middle ear inflammations must proceed from infection through the Eustachian tube, and prove that a proper treatment of these inflammations must include an appreciation of the epipharynx.

An exact diagnosis should also include a bacteriological examination of the secretion, which, I am afraid, most of us neglect. The presence of streptococci in the secretion makes the prognosis

much worse than the presence of staphylococci. The presence of tubercle bacilli is a strict contra-indication for operative measures, unless an acute condition imperatively demand them. As this point will be taken up in another paper this afternoon, I shall proceed to outline the different methods of treatment. Broadly speaking, we can recognize the dry and the wet treatment. Both include the cleansing of the ear with various detergent and antiseptic fluids. The usual ones are plain boiled water, solutions of boric acid, corrosive sublimate 1 to 2,000, bicarbonate of soda, etc. Potassium permanganate (Liq. Potass. permang. drachm ss to 5 VI), makes an excellent disinfectant and deodorant. Carbolic acid, in 1 or 2% solution, and formalin 1 to 500, were formerly used, but have been abandoned as too irritating. Having dried the ear, various astringent and antiseptic fluids are then introduced, if the wet treatment is adopted. The number of drugs used in this direction is so great that I shall content myself with quoting a few of them only. Silver nitrate in weak solutions, argyrol, protargol, zinc sulphate, salicylic acid in alcoholic solution, boric acid in alcohol and glycerin, resorcin, and many others. The use of the gas forming solutions, such as peroxid of hydrogen, and its compounds menthol, camphoroxol, etc., deserve a word for themselves. When the perforation is large and they are used by the physician, I think much good can be had of them, as they penetrate into the recesses of the middle ear, notably the hypotympanic space, and facilitate the removal of inspissated secretions which would be washed over without being disturbed by the usual solutions used in syringing. I do not think that their use should be intrusted to the patient, especially not when the perforation is small, as there is little doubt that many a case of mastoiditis has followed their slipshod use.

In the dry treatment various powders are applied to the middle ear after syringing and drying. These powders are mostly combinations of some iodin derivative with finely powdered boric acid. The use of pyoaktanin blue is warmly recommended by G. L. Richards. It is dusted into the cavity as thickly as possible, a gauze drain or a pedge of cotton packed in, and the ear is not touched for two or three days. Richards claims that in this way every part of the diseased area is reached. The drug is non-poisonous, and the stain can be easily removed from the skin with alcohol. W. C. Phillips has tried radium without results. The use of the stronger alcoholic solutions is indicated when the secretion has grown much less in quantity. McKeown gives an 8% solution of salicylic acid in alcohol as a good remedy when there is exfoliation of the epithelium and a roughened condition of the canal walls. The treatment with gauze wicks, either plain or saturated with an astringent, also deserves mention.

The treatment by Bier's method is one which I have never known to be tried in this part of the world, but several of the continental aurists have reported their results, and they seem to encourage a trial. In acute otitis media it is not only useless,

but even dangerous, as it masks the symptoms of mastoid involvement. In chronic otitis, however, it has been tried in 30 cases, of which 7, at the time of reporting, had shown marked improvement in hearing, the pus and fetor had vanished, and the mucosa had healed, or the tympanic cavity had become epidermatized. Fifteen other cases had shown marked improvement, but had not remained long enough under observation to warrant any statements as to permanency. Two other cases, although undoubtedly tuberculous, were improved. Some of these cases were of as much as 35 years standing, and had resisted other forms of treatment. A suction bell of 5 centimeters diameter was used, applied at intervals of 2 to 3 days, generally for 10, and never for more than 15 minutes. From 2 to 35 applications were made. The suction was strong enough to show a distinct swelling of the auricle, but never strong enough to cause a distinct pain in the ear. Stimmel says it is surprising how much pus and serum are found in the ear after using the suction treatment, even when the ear has been thoroughly dried prior to using suction. Caries and cholesteatoma contraindicate the treatment, but small hemorrhages coming from granulations do not.

Time will not permit me to go into the treatment of chronic suppuration of the attic, nor to take up the subject of cholesteatoma. In most of these cases I think that surgical measures would probably have to be resorted to.

I do not consider a case of otitis media cured until the drum membrane has been restored, and I think we should keep the patient in hand until that has been accomplished. Occasional touching of the edge of the perforation with trichloracetic acid gives good results. Blake proposes fitting a disc of very thin sterilized paper over the opening, which seems to stimulate the growth at the edge of the perforation.

One point we should not overlook in our treatment is that the patient or whoever undertakes the home treatment can be of the greatest service to us, and that we should see that whatever home measures we recommend are carried out in the proper way. A little time spent in instructing the patient or relative in the proper way of using the syringe, in drying the ear and insufflating the powder, etc., is well spent. We have all seen cases in which no progress was made until the home treatment was put on a proper basis; and we have also seen cases in which retention with its attendant danger was due to too liberal use of the powder blower.

In conclusion, allow me to say that the burden of this paper is: Give every patient with chronic suppuration of the middle ear a chance to see whether he cannot be cured by medical means. Do not hurry him into an operation which carries with it all the dangers of a major operation with the added possibility of infecting the brain tissues. A colleague says that he considers it better to operate ten mastoids unnecessarily than to allow one necessary one to escape. That is the other extreme. If you want to have substantiation of my view, read V. Ruppert's splendid article already referred to, and you will have a much more exalted opinion of the possibilities and results of the conservative treatment.

INDICATIONS FOR OPERATION IN CHRONIC PURULENT OTITIS MEDIA.*

By EDWARD C. SEWALL, M. D., San Francisco.

How is to be decided the question when and upon what patients are we to operate radically in chronic purulent otitis media? Since the work of Schwartz, and more particularly of Stacke, which began a new era in the treatment of purulent ear disease, surgeons, because of the multitude of cases and statistics, have found out the worth of the measure and its limitations. The methods of operation, and the after treatment are fairly uniform, and the results in the proper hands are well known. That the operation is one of the first magnitude is recognized. Granting that the operator has full knowledge of the parts and the necessary technical skill, that it puts in jeopardy the life of the patient not only through the possibility of infection, but also to a certain slight extent through the use of an anesthetic, can not be gainsaid. These dangers, which are almost inconsiderable, in uncomplicated cases, should not be overestimated, but cannot be disregarded in weighing judgment in a given case. Other facts that must enter into our calculations are,

- I. That the operation does not promise absolute freedom from discharge.
- II. Even when a perfectly dry ear is the result, the formation of epithelial debris and accumulation of wax leading to irritation of the epithelialized area often necessitates the occasional attention of the surgeon.
- III. The time required in the tedious after treatment, which the ablest surgeons place at 8 to 12 weeks, on an average.

These facts do not in any way figure when we are considering cases which are dangerous to the life of the patient. The operation is then one of necessity, not of choice. However, when we are contemplating the advisability of operating upon an ear which in no way is dangerous to life they are important.

The points that come up for consideration when a patient suffering with chronic purulent otitis media presents himself to the surgeon are as follows:

- I. Is the ear dangerous to the life of the patient?
- II. Can the ear if considered dangerous be put into the safe class by measures other than the radical operation?
- III. Is the ear free from danger to life, and if so shall it be operated upon?

It would be a simple matter to dispose of the question of operative necessity were it possible to throw all cases into the dangerous or non-dangerous class. Great difficulty is encountered in deciding this question, and no particular branch of surgery is more benefited by wide clinical experience.

The appearance and characteristics of a dangerous ear give a picture which in many cases is not difficult to interpret. There are many factors entering into

the formation of such a picture. Often instinctively the able clinician recognizes that he has a perilous situation to deal with. Asked, however, to write down the points that have lead him to consider an ear dangerous, and of necessity operable, and he would have difficulty in defining his reasons. The cultivation of a certain clinical feeling is an excellent and inevitable consequence of large experience. This clinical sense, however, must be accompanied by facts which one can put into writing if progress is to be made; otherwise it is liable to give a complacency that is subject to rude awakenings.

The diagnosis of the dangerous ear is made on objective appearance, subjective symptoms, or the combination of the two. We will first take up a consideration of such cases.

Often the patient may present no subjective symptoms whatever. Such cases are most difficult to handle properly. The kind and situation of the perforation in these dangerous cases is of considerable importance. A perforation in the upper part of the drum is worse than one in a lower segment. A hole in Schrapnel's membrane is especially significant, because of the anatomical structure of the attic. Such a perforation must necessarily mean disease of that narrow space. Either the pus has broken through Schrapnel's membrane via Prussac's space or directly from the attic.

A marginal perforation, that is, one which extends to the tympanic ring, especially where such a perforation is in the upper posterior segment, and is accompanied by a roughened condition of the adjoining bone, must be given its proper value as a danger signal, indicating often disease of bone in the antrum.

Granulation tissue not only acts injuriously by blocking the drainage from the diseased parts, but when coming from such a perforation just mentioned, must be taken often as an evidence of necrosis in the attic or additus.

The character and amount of discharge is of great importance. A large amount of creamy pus rarely comes from the middle ear alone. The greater the volume of the discharge, the greater the diseased area. However, the danger is not necessarily in proportion to the amount, for the presence of granulation, or small perforation, or other obstruction such as exostoses of the external canal may lead to suppression of discharge, and increase in the danger. Many times are these patients comfortable with this discharge as long as it flows freely, but exceedingly disturbed from headache and dizziness when from obstruction, the discharge is lessened.

The direction from which the pus comes is very important; is worse again when coming from the upper posterior region. The Siegel otoscope is of use in determining the direction from which the pus comes by employing gentle suction after cleaning.

The bacteriology of the pus in these chronic cases is usually not of much significance. The germs, no matter what sort, usually become comparatively inactive because of the chronicity of the process, but quickly regain their virulence when obstruction confines them.

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Odor of the discharge has considerable significance. It may be due to decomposition of accumulation in an improperly cared for ear. In such a case, a few irrigations will remove the stench. However, when after repeated washings, especially where irrigation of the attic with canulae has been employed, the odor persists, it is often evidence of extensive destruction in parts inaccessible to our washings, and indeed may mean the presence of that sponge-like mass, cholesteatoma, which holds on to the odor so tenaciously.

Cholesteatoma (nearly always we should say pseudo-cholesteatoma) forms one of the most significant evidences we have of the dangerous character of the ear.

Its presence is diagnosed by seeing it in the fundus, or by the white bits that come out in the washings, and sink in the solution, or by extracting it with the blunt probe. It often hangs in little tufts, somewhat resembling the tufts of leptothrax on the tonsil, from the attic and as we wash or brush it away other flakes appear. Although usually an operative indication, it is not necessarily so, and even has been known to produce a condition in the antrum and attic through pressure, surpassing that result obtained by operation. Its dangers, however, are hard to overestimate. We are toying with the "dynamite bomb" as Macewen says, in allowing it to remain hidden and unoperated upon.

The probe examination for caries is of some help, but I am inclined to think that its usefulness is easily overestimated, and that harm may come from its too free employment. Also there is no doubt that the sensation of rough bone is often produced by the surgeon's too firm pressure. I am sure of this in my own cases because I have had instances where I demonstrated caries to my complete satisfaction, and had the same cases heal in a few weeks under treatment. I think we should use the probe only with the greatest caution.

I shall not go into the symptoms and diagnostic signs of an acute mastoiditis complicating a chronic purulent otitis media. It has all the characteristics of such a case when acute, with grave possibilities added. Such an attack puts an ear in the dangerous class at once. If allowed to heal without operation, the parts must be in much worse condition than before, and intracranial complications much more liable to occur.

The subjective symptoms that add to our knowledge of the dangerous character of an ear are liable to misinterpretation, both on the part of the patient and the surgeon.

Headache is an important symptom; that it accompanies, sometimes, these chronic purulent otitis medias there is no doubt. We often see it come on suddenly when the discharge is in some way blocked, to disappear again when good drainage is established. It is a symptom of great value, but as we have so many other conditions, including hysteria, which produce this symptom, its value is a matter for good judgment of the surgeon to determine.

Intracranial symptoms, which the scope of this paper will not permit of enumeration, immediately put our ear into the operative class.

In vertigo, we have a symptom which also is liable to a good deal of misinterpretation on account of the patient's misconception of it. However, a true disturbance in the sense of equilibrium signifies disease of the labyrinth, and is to be recognized as a dangerous symptom. This subject of labyrinth disease, and the methods which have been recently worked out, we can only mention in passing, as they form such a new, interesting and important part of our advanced ideas of ear disease.

The hearing does not enter into consideration where we are dealing with this first class of cases.

Class II. Can the ear, if considered dangerous, be put into the safe class by measures other than the radical operation? Yes, I think they occasionally can. Thorough cleansing and removal of debris by Hartman's canulae, or other methods, and the use of quickly drying solutions in cleansing and the employment of dry treatment as consistently as possible, even to wiping out the attic with fine, soft cotton swabs, will give results at times rather unexpected. I have seen cases with cholesteatoma, ragged, marginal perforations in the upper posterior quadrant, although not accompanied by much discharge or other symptoms, heal entirely under this treatment.

Class III. Ears discharging, but not dangerous to life: Is it possible for us to make such a classification? Can we say that such an ear will not light up and suddenly lead to grave complications? I think we can. I think the danger from such an ear as I shall now speak of, is no greater, or very little greater than to a normal ear. One may light up occasionally, and lead to operation, but so will a normal ear, become diseased and I think there is about as much reason in surgeons operating on all such ears as there would be in removing all appendices from the new born.

The ear I am going to describe can be quickly considered by excluding the features portrayed by the first class, or dangerous ears. The perforation, instead of being marginal, is usually central, or low, and surrounded by a good bit of drum margin. The remains of the drum present a fairly thin appearance. The mucus membrane of the promontory is or is not injected, swollen or reddened.

The discharge is not milky pus, but is either thin mucus in character, or is muco-purulent; is of small amount, and except when the patient has a cold it almost disappears. Study often shows it to be coming from the region of the Eustachian tube.

Such an ear has none of the symptoms which we consider indicative of danger, but it will not become dry under treatment. The disease clearly is located in the tympanic cavity. What good is done by an operation on parts which are not diseased? Of course the region of the Eustachian tube can be curetted and if the disease is confined to that part, a cure obtained, but that could be accomplished without the entering of the antrum and attic. If disease of other parts of the wall of the middle ear is the cause of the continued discharge, it will not be possible to curette freely enough or certainly enough to cure because of the possibility of damaging the stapes, or internal wall, forming a com-

munication with the inner ear through which dangerous infection might pass.

These are the cases which after a well performed radical operation, still continue moist. The operation was not indicated and when it was done it did not meet the necessities of the case.

THE DIFFERENT OPERATIONS FOR CHRONIC SUPPURATION OF THE MIDDLE EAR.*

By H. BERT. ELLIS, M. D., Los Angeles.

The treatment of chronic suppuration of the middle ear certainly does not present a brilliant field for medicine or surgery. Local treatment of a medical character frequently stops a discharge which has existed for months or even years, but the suppuration is more than likely to return with the first severe so-called "cold in the head" or on exposure to untoward atmospheric conditions. This fact has caused a reaction from local therapeutic measures to surgical interference.

The objects of treatment in chronic suppurative otitis media are, 1st. To arrest the discharge; 2nd. To prevent complications; 3rd. To restore hearing.

The surgical procedures invoked to accomplish these objects may be classified (1) adenectomies; (2) curettage; (3) ossiculectomy; (4) the meato-mastoid operation and (5) the radical mastoid operation.

1. *Adenectomy.* The first surgical procedure in a chronic suppurative otitis media is to remove all adenoid tissue, and to reduce such superfluous nasal tissue as may be necessary to give natural nasal breathing, for we may be tolerably certain that to remove the discharge from the ear, it will be necessary to get rid of the infecting secretion from the Eustachian tube, and this is particularly so when the perforation of the drum head is centrally located over the tympanic orifice of the Eustachian tube. In these cases, it is sometimes necessary to dilate the isthmus of the tube, in addition to doing the adenectomy.

To remove adenoids it is better to use a general anesthetic in all children under sixteen years of age, excepting in such individuals whose pathological condition contraindicates the use of an anesthetic, and it may be well to state right here that chloroform is *always contraindicated* in the adenoid operation.

2. *Curettage.* When polypi or granulation tissue are present in the external auditory canal, they should be snared or curetted away. A perforation of the membrana tympani at its margin usually means necrosis of the bony walls or of the ossicles. When the perforation is at the lower border, the floor of the middle ear may be cautiously curetted with a small bent curette, after making the opening in the drum head sufficiently large for perfect drainage, but if sepsis be present, one must be on the lookout that the jugular bulb is not infected, and if it be, nothing less than the radical operation will suffice. If one is able to secure smoothness of the

floor, then the daily or bi-daily cleansing and packing lightly with sterilized gauze till the necrotic area is healed, may result in a cure. If the perforation be at the anterior margin, the anterior wall is probably necrotic and the curette may be used, but also with great caution, because of the close proximity of the carotid artery. Curette is usually performed under local anesthesia.

3. *Ossiculectomy.* When the perforation is just above the short process of the hammer, the head of this bone is most probably necrosed, and the hammer should be removed. If the perforation be at the upper margin, involving Sharpnell's membrane and edge of canal, the inner wall of the canal, as well as some portion of the ossicular chain, is probably necrosed. In these cases, curettage will accomplish little or nothing, but the ultra-conservative aurist may try ossiculectomy, and oftentimes with gratifying results. However, since 1893 when MacEwen presented his historic work on "Pyogenic Diseases of the Brain and Spinal Cord," this operation has almost fallen into disuse.

Ossiculectomy may be performed under local anesthesia, but with it the pain is very severe; probably the best local anesthetic is a mixture of equal parts of cocaine, carbolic acid and menthol. The drum head swabbed with this mixture becomes tolerably well anesthetized in from fifteen to twenty minutes. General anesthesia is usually necessary in order to do the operation carefully and thoroughly. The auricle and external meatus should be scrubbed with liquid soap and warm water, followed by an alcoholic bath. The incision is probably best begun at the center of the anterior margin, continued upward to the malleus and then along down the handle to the umbo, then upwards along its posterior border, then backward to the posterior border of the membrane, leaving a large portion of the membrane for regeneration and repair, though sometimes this may interfere with drainage and must be watched. The tensor tympani muscle is then cut with an angular knife, as well as the ligamentous attachments of the malleus to the outer wall. The malleus may then be removed with forceps or the ring knife. The incus is best detached with the incus hook, and the bleeding, which is frequently very troublesome, may be controlled by a hot 1 to 2000 bichlorid of mercury solution, after which it is dressed with a strip of sterile gauze, loosely packed and sealed with collodion.

The object of operative procedures by way of the auditory canal is primarily to secure free drainage and to remove necrotic and carious tissue, when such is present in the tympanic cavity in limited and easily accessible areas; thus we often remove parts of the auditory conducting mechanism and at the same time carry out the well-known surgical principle of removing obstructions to the thorough evacuation of purulent collections, as previously described. By these means, provided the tympanic focus of infection is limited and available to such instrumentation, the causes which keep up the discharge are removed with the elimination of the diseased bone, and the surgical cleanliness which may then be obtained. In addition to removing the

* Read at the Thirty-ninth Annual Meeting of the State Society, San Jose, April, 1909.

necrotic tissue and carious bone, marked mastoid changes are prevented (especially when the malleus and incus are removed), because of the better drainage and facilities for getting at previously inaccessible parts above and behind.

In selected cases of chronic suppuration, persisting in spite of ordinary non-operative measures, intra-tympanic operation is undoubtedly most promising and is also remarkably free from risk to the life of the patient.

While it must be borne in mind that in practically all cases of long standing diseased bone is almost always present, yet when the carious areas are confined to the two larger ossicles, or, to parts of the tympanic walls accessible through the canal, excision and curettage present an almost ideal form of operation, as its performance is comparatively simple and safe, and in a large percentage of these cases a permanent cure may be confidently expected. And it has the advantage of not requiring an external wound, nor keeping the patient incapacitated for any considerable length of time; but, if hearing is of the first importance to the patient, it is well to avoid ossiculectomy, provided the hearing approaches normal, as the operation impairs the hearing in probably fifty per cent of the cases operated upon.

The final results, in so far as amelioration or cure are concerned, are usually most gratifying, especially if the accessory cavities or walls are not too extensively involved.

In some cases, the suppurating ceases within a few weeks with but little after treatment; in other cases, it may require as many months, with extreme care as to details; while in those cases which do not yield, a radical mastoid may still be necessary.

Oppenheimer says: "In all cases of chronic otitis media conservatism should demand ossiculectomy prior to the performance of the mastoid operation," and the writer is inclined to the belief that our zeal for the more radical operative procedures has, to a considerable extent, placed ossiculectomy in the background. There is no question that many cases are susceptible to cure by the performance of ossiculectomy, yet failure in no way compromises a more extensive operation, but rather is only a step towards this end, if such be necessary.

4. *The Meato-Mastoid Operation.* Chronic suppurative otitis media with a central perforation frequently only means a simple infection of the mucous membrane of the middle ear, and therefore quite often responds to local treatment, but if suppuration persists, after the adenoid tissue has been removed, the Eustachian canal has been treated, and the middle ear itself thoroughly taken care of for several weeks, and if there be no necrosis of the bony walls or ossicles, then the meato-mastoid operation may be performed.

The technic varies but little from that of the radical operation. The antrum is opened and the mastoid cells cleaned out, then the posterior wall of the external auditory canal is cut away, down to the annulus tympanicus, neither the drumhead nor the ossicles being disturbed. All of the posterior wall of the external auditory canal that can with safety be removed is taken away in order that

drainage may be as little impeded as possible, and that the after dressing may be made without too much distress to the patient. The operation and the dressings are essentially the same as in the radical operation.

5. *The Radical Mastoid Operation.* At the present time, probably the most difficult problem in chronic suppurative otitis media is to know when to open the mastoid in the absence of any well-marked symptoms pointing to its involvement, and while general indications may be formulated, the question as regards the individual case must be solved by the particular conditions present in that case. Politzer gives the following indications:

(a) *Subjective.* 1. Persistence of pain in the ear or over the mastoid process. 2. Permanent or intermittent attacks of vertigo, due to erosion of the external semi-circular canal. 3. Marked cerebral disturbances.

(b) *Objective.* 1. Caries of the wall of the tympanum. 2. Granulations and polypi in the vicinity of the aditus and recurring quickly after removal. 3. Fistulous openings in the cortex. 4. Cholesteatoma. 5. Hyperostotic stricture of the external auditory canal. 6. Facial paralysis or paresis. 7. Painful swelling of the mastoid. 8. Prolonged fetid suppuration, resisting treatment, especially if the upper posterior region of the membrana tympani is perforated and its remnants are adherent to the internal wall of the drum cavity, and more so, if pus and epithelial masses can be drawn from the region of the aditus by aspiration. 9. Symptoms of tuberculosis occurring in a case of chronic suppuration (aural suppuration in a case of pulmonary tuberculosis being a contra-indication for operation on the mastoid). 10. Evidences of intra-cranial or sinus involvement. He further believes that when the objective signs are accompanied by some of the more serious subjective symptoms, operation becomes imperative, but as clinical symptoms and pathological findings do not always correspond, it is impossible to lay down strict rules to indicate when the mastoid operation should be performed. (Oppenheimer.)

A radical mastoid is indicated when, during the course of a middle ear suppuration, general symptoms of septic absorption, otherwise unaccounted for, make their appearance. (Kopetzky.)

Unless bone necrosis is very extensive, local measures, tympanic curettage and ossiculectomy should first be employed. If they fail to afford relief, proceed to the radical mastoid operation.

Discussion.

Doctor D. H. Trowbridge, Fresno: I think a good deal of our chronic suppuration is due to neglect of treatment at the time. This is due to the fact that very few of these cases come into our hands just before or shortly after the membrane has ruptured and very few of these cases continue very long with a suppuration. I fail to remember over a period of time, any of these cases that I would not have been able to clear up the discharge, unless they had gone on to more serious complication of the mastoid cells, and of course have required an operation for acute mastoiditis. I think that our treatment of these cases should be a little more radical than it has been in the past. We should keep up

the free drainage and not hesitate to make an early paracentesis, and after that if the opening tends to close and drainage does not appear to be established, we should make repeated enlargements of the opening and usually under anesthesia. I find, as a rule, I am not able to make a second opening of the drum membrane under cocaine or local anesthesia, as the patient will involuntarily jerk away. Consequently a little gas or ether is better in making a thorough opening and enlarging it along the posterior auditory canal, especially in those cases where the discharge has a tendency to continue and where there is more or less tenderness over the mastoid. As far as radical treatment is concerned, I do not believe I will give my opinion. There are many others here who have operated more than I have. There is no question that a great many of these cases which go on and we are unable to clear up with local treatment, should be operated on. I know of three cases in my neighborhood which have died in the last year from brain abscesses undoubtedly due to suppuration of the middle ear, which were not operated upon.

Doctor Hill Hastings, Los Angeles: In opening the discussion on the indications for operation for chronic ear discharge, I should like to bring up for discussion some contra-indications. In doing so I do not wish to take an opposing view to Dr. Sewall, for I strongly believe in the opinions expressed by him so clearly. But it is likely time limit forbids his detailing certain points on the other side of the question. It is no good argument to say that some radical operations are needlessly done, however true it may be; for in the hands of an experienced man in the long run he will prevent many deaths that would have resulted from ultra-conservatism. Nevertheless, the radical operation is in itself not free from danger. It is an operation that should never be done, in my opinion, without the most searching diagnostic examination, without thorough preliminary treatment, and then only by one who has good operative training. There are some particular points I should like to bring up for discussion. I am assuming that we are to discuss the radical operation done solely to stop a chronic ear discharge and the dangers that might result therefrom; and not that mastoid suppuration is already evident. 1st. As to the patient's general condition. I think we should most painstakingly search into his previous history and present general condition, and that operation is contra-indicated until we have made the search. The two main points in the general history are the presence of tuberculosis and the presence of diabetes. In the former disease it is my experience that a radical operation is rarely necessary; dangerous secondary infections rarely occur, also that the repair after mastoid excavation in tubercular patients is slow and often incomplete. In diabetes, on the other hand, dangerous secondary infections are apt to occur and mastoids so infected run a bad course; nevertheless, the danger of the radical operation is heightened by this same lack of resistance. If the discharge becomes profuse and persistent one is justified in performing the radical operation, even though no mastoid pain or tenderness, fever or other acute symptoms have arisen. I have seen in diabetic patients extensive epidural abscesses form; and in one case rapidly developing meningitis resulted fatally, without warning, other than the persistent discharge. The medical consultant stood out for delay on account of diabetes. As to the radical operation in children, I feel it should rarely be done, except for two conditions, cholesteatoma, and signs of internal ear involvement. In other conditions I am inclined towards the meato-mastoid operation, which secures evacuation of any lurking mastoid disease, secures the best possible middle ear drainage and still leaves untouched the tympanum and its hearing function. Any one who has seen a hundred or more radicals and done the after treatment can

not fail to be impressed with the large numbers of failures, in children, to stop the discharge. And to stop the discharge is what the parents seek. In children, especially, treatment of the nose and naso-pharynx, removal of adenoids, etc., should be most thoroughly tried before operating. A long period of local ear treatment should be insisted upon. It is interesting to note the trend of the discussion at the 1908 German Otological Society meeting, where so many ear men laid stress on the value of the old treatment by cleansing, drying and insufflation of boric acid powder. As to cholesteatoma, when its presence is determined, I think we should rarely hesitate to urge radical operation.

A word as to signs of internal ear suppuration, as indications for the radical operation. The material progress in otology in the last year or two has been along the lines of diagnosis of suppuration of the middle ear. It has taught us much and we can look back on cases where death resulted from meningitis where no mastoid suppuration had existed and where we felt at a loss to account for the fatal issue. Suppose a child or adult begins to have nausea and vomiting and a little dizziness—symptoms referable to the stomach—a little fever begins, increases, meningitis develops and death results; it is not conceivable that neither the patient nor the family physician paid much attention to an old ear process which was not causing any mastoid swelling and no pain or tenderness. The valuable work of Barony, Von Stein, Alexander and others now teaches us how to search out the signs of internal ear suppuration. It is well to remember that in children the communications between the brain cavity, particularly the posterior fossa, and the internal ear are quite large and permit infections to spread in either direction more easily than in adults. I think the radical operation is contra-indicated in every case until we determine as nearly as possible the condition of the internal ear, the static as well as the auditory parts of the internal ear.

Doctor Redmond Payne, San Francisco: I was very glad to hear Dr. Ellis include in his operations for chronic suppuration of the middle ear, not alone operations directed to the middle ear itself and the mastoid, but also take into account the nose and throat, and condition of the tubes. I think I quite agree with Doctors Sewall and Ellis with regard to treating these cases along milder lines, and very thoroughly, before resorting to the radical operation. I do not think that complete treatment of a suppurative middle ear has been given until thorough treatment of the nose and naso-pharynx is considered in connection with it, particularly with regard to the patulousness of the Eustachian tube. Dr. Ellis spoke about the turbinates and adenoids, the condition of the naso-pharynx and the dilation of the Eustachian tube, the last an exceedingly important matter in carrying out the complete mild treatment, or non-operative treatment of the middle ear, the object being to secure thorough drainage of the contents of the middle ear. It seems to me that the whole ear apparatus should be considered, the nose and throat, the Eustachian tube and the middle ear, and the antrum of the mastoid—all should be taken into account when we consider the treatment of the middle ear. It should be considered as a whole and every part looked into carefully before operation is determined upon. The detail of the treatment of the middle ear is of tremendous importance. A small opening in a drum should always be enlarged so that the middle ear can be gotten at thoroughly, and the middle ear end of the Eustachian tube looked after. A method of treatment which I have found successful, after attending to the nose and throat and the naso-pharynx, and the tube has been dilated, is to inject 10% argyrol into the middle ear through that part of the tube where infection is so frequently retained. It seems to me from what I have observed lately in the cases

of Doctor Ballinger in Chicago and Jansen in Berlin, that the modified radical operation is being adopted by many, and is giving better results for hearing as well as getting rid of the disease quite as certainly. I refer to the Heath operation, and I believe that is the one Doctor Ellis means in the term meato-mastoid. When the radical operation is indicated I believe that better results will be gotten by this modified radical operation in all cases except cholesteatoma and where there is suppuration or infection of the labyrinth.

Doctor Kaspar Pischel, San Francisco: It has been mentioned that even after a successful mastoid operation, patients often come back to the doctor with a running ear. Such occurrences are a great disappointment to the patients or their parents; they think that the old trouble has come back again, while we know that it is usually an eczematous condition, a breaking down of the thin covering of the bone. In order to prevent that we should try to cover it with a good healthy skin. In 1901 I recommended the use of a skinflap for immediate closure of the mastoid wound which has served me well. (Archives of Otology, Vol. XXX, 1901.)

Doctor R. D. Cohn, San Francisco: I think the crucial point in this entire discussion is: should every case of chronic middle ear suppuration be operated upon or not? Doctor Welty thinks it should. This is a standpoint against which, in common with Doctor Sewall, I protest. I believe Doctor Welty is virtually alone in his extreme view, according to which every case of ear suppuration which does not heal in from six to eight weeks should be operated upon. There would be some justification for this standpoint only if every person with chronic middle ear suppuration who went along without operation were lost if once complications developed. This, however, is very far from being the case. The removal of the tympanum and of the ossicles is not a matter of indifference to the patient, since the faculty of hearing depends in great measure upon the integrity of these structures. Therefore, to ream out the tympanic cavity in every case of chronic suppuration is a reprehensible procedure unless the life of the patient is in jeopardy. In the absence of fever, the absence of positive involvement of the mastoid cells, the absence of cerebral symptoms, the operation should not be done at all. With these conditions present, or with undoubted evidence of cholesteatoma, the antrum and the other mastoid cells should be opened. When the radical operation proves injudicious, the Schwartz procedure as improved by Stacke is without doubt the method of election.

Doctor W. E. Briggs, Sacramento: The important question brought out by the discussion this afternoon is as to the time to operate in chronic middle ear trouble, and whether all cases should be radically operated upon. Like many others of this Association I have changed my views on that question at different periods of my work. I remember one time a good many years ago, after spending some months with Doctor Jansen in Berlin, I came home with a good deal of enthusiasm, and thought that every case of middle ear suppuration should be operated. In Paris I had learned that every case of chronic ear suppuration ought to be operated if not cured after four weeks. In the hands of men who have less experience than Doctor Jansen, I have concluded that it is not good advice to give generally. I have had a great many good results. I have had some cases of extensive operation, healed in less than two weeks, but on the other hand I have had others that have done as badly as any one's. Gradually I think I have become a little more conservative than I have been at some periods of my practice, and I think that the tendency will be to be a little more conservative. I do not believe that the danger is so great. I see a great many of these cases cured after careful treatment and after you

have taught your patient or the friends to give the patient the very best possible attention, I think you will find a very large percentage relieved of all danger and be in a much safer condition than if they had a hasty operation or a radical operation. At the present I think I stand very much as Doctor Sewall has expressed himself.

Doctor J. D. Arnold, San Francisco: A symposium upon chronic suppurative middle ear disease always develops into a question as to the advisability of operation upon the mastoid. I am very prone to lay very much more stress than even Doctor Sewall did upon the real condition of the tympanic cavity before any question of operation arises. As to the operation itself, many of us will remember that it is only twenty years ago that the operation really attained anything like a competent technic. The mastoid operation before the time of Schwartz was an alternative to rapid death. We can remember very well when no mastoid operation was done, particularly not the radical operation, unless cerebral symptoms were present. Schwartz taught us that there were indications for operation even in the absence of cerebral symptoms. Without again going over the history of the measure, this much may be said as to the indications. It is certainly not judicious to operate upon every case of chronic suppuration of the middle ear in the absence of cerebral complications, merely because the suppuration has lasted two or even ten weeks; but just as soon as symptoms point to an inflammation of the mastoid cells then operation comes into question. When a discharge from the middle ear is accompanied with a rise of temperature, then you have an indication for opening the antrum and mastoid cells. The question as to whether an operation shall be radical will depend entirely upon the condition of the parts found at the time.

Doctor G. P. Wintermute, Oakland: Where the mastoid cells are involved, if the drainage is good, there is no mastoid abscess, but the mastoid cells are involved in every case of otitis media. If the case does not get well after six weeks' irrigation, there is bony destruction there probably, and while I have no objection to an ossiculectomy being done previously, still you must remember that the tympanum is only a small portion of the diseased area. It may be the only portion in which there is bone necrosis, and in such an event it will be successful, but as it is a small portion of the pathological area, it will not be followed by good results. I do not believe in operating on tubercular cases, and I think these should be excluded. I think it is simply a case of having diseased bone, and conservative treatment allows it to run and trusts to Providence, so to speak. You do not get any further with an attic canula than the antrum. It seems to me the logical procedure is to go in and clean out your diseased bone when you can exclude tuberculosis.

Doctor W. M. Fredrick, San Francisco: I have very little to add to my paper, inasmuch as all the other readers of papers, and those who have discussed them, have supported me in maintaining the contention that we are to-day far more conservative in regard to the treatment of the middle ear than we were formerly, and are becoming more and more so every day. There is only one point I would like to make here. The speakers have mentioned suppuration as having existed for so many weeks, etc. We cannot say that a suppuration has existed for so many weeks unless it has really been treated, and in the majority of cases it has not been treated at all. We cannot call the visits of the patient to the office, treatment. We should spend a great deal more time than we do in seeing that the patients are properly treated at home, and we should teach them how to wash the tympanic cavity out properly. If we watch the majority of laymen trying to wash the ear we will see that they wash the canal and that the tympanic cavity receives no treatment whatever.

We should insist that the treatment should be done as we want it done, and not in a careless, slipshod way. I have seen marked changes take place in the conditions when the home treatment has been carried out as it should be. Von Ruppert has shown what can be done in treating these patients correctly, and he has obtained what he concludes to be complete cures. Of course the surgical treatment of these patients is a more brilliant one and perhaps more impressive, but the results should make us hesitate to undertake it. As Doctor Fischel has said, the patients and parents are so often thoroughly disappointed when, after undergoing all the dangers and expense of a mastoid operation, they find that the discharge will return at intervals. This is a matter of great disappointment and sometimes the patient will consider that the work was not done at all when told that he will have to remain under observation. On the other hand, if we can put a stop to the suppuration, and obtain a healing over of the perforation, the patient is liable to an acute suppuration of the middle ear, in a somewhat greater degree than if his ear were quite normal; but the danger of the suppuration returning is far less than in those cases where the natural protector of the tympanic cavity, the drum, has been removed. Personally I know of cases in which the suppuration has not returned in thirty-five years and over.

Doctor H. Bert. Ellis, Los Angeles: I must say that I have become much more conservative in my views on radical operation than I was five years ago. In the absence of definite symptoms for radical operation in cases of chronic suppurative otitis media, I hardly believe we are justified in doing the operation until we have tried removing all necrotic tissue which we can reach through the canal and have put the tube in a patent condition. When we have done this and the suppuration continues and the hearing is badly involved and the patient is suffering from the discharge and the sense of its unpleasant effect, then we may be persuaded to do the radical operation. If we have definite symptoms, such as brain symptoms and cholesteatoma, then we are perfectly justified in operating.

MOMBERG'S TUBING APPLIED AS A TOUNRIQUET FOR BLOODLESS SURGERY OF THE PELVIS.

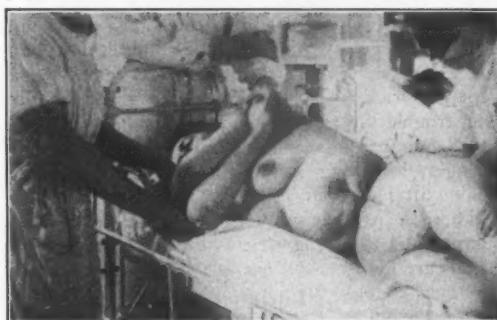
By GEORGE K. HERZOG, M. D., San Francisco.

The compression of the abdominal aorta as a method of arresting hemorrhage is not new or untried. The great difficulty heretofore has been the method. The most common employed has been pressure made by hand with or without a pad over the aorta which has always proven to be tiring to the operator and usually unsatisfactory. The other method, known as Dupuytren's, consisted of a semi-circle of metal with a pad at one end which when fastened made a tight band. This was also unsatisfactory as the metal cut and the distribution of pressure was irregular.

Momberg's tubing is now adopted among our German colleagues as efficient, safe and rational. It consists of ordinary rubber tubing about $\frac{1}{2}$ -inch in thickness and about 5 feet in length, the plain stomach tube minus the bulb makes an admirable tourniquet for this purpose. This tubing is placed twice around the abdomen a little below the umbilicus and tension is then made until the femoral ceases to pulsate. The tube is then held by the hands and hemorrhage from below is completely under control. No method of holding the two ends other than by

the hands has been found to be feasible. At first this procedure seems dangerous and crude but observation has taught me that it is perfectly safe and the results surprising. A few cases that I observed in Bumms' Clinic in the Charité Hospital of Berlin will be herein recorded, also one by Bier and one by Hobauer. This method has been used by Sigwart and Roeck, Bumms' assistants, with splendid results. Its adoption in post partum hemorrhage is ideal and greatly to be recommended. The fear of tying off the whole lower half of the body by actual experience has proven to be groundless. I saw Doderlein in his clinic in Munich demonstrate the Momberg on a puerperal patient without an anaesthetic. The tubing was held for ten minutes without complaint. In most cases anaesthetics are used but usually for the accompanying treatment, not on account of the tourniquet. Momberg put this method into application following experiments on animals. As soon as one is convinced that the results are so gratifying, one forgets the impression of the amount of force that is used.

Bier in a case of sarcoma of the hip used the Momberg in amputating the part under spinal anaesthesia. The man did not complain and did not lose but little blood; the operation was performed with the patient



in the Trendelenberg position. The usual shock following this operation was absent and Bier recommends the Momberg in all larger pelvic cases. He says that the Momberg is pretty and simple in results. This case lasted 45 minutes.

Hofbauer reports a case of a large myoma, the size of a man's head which he removed per vaginæ with the aid of the Momberg. He reports the operation as being absolutely bloodless and lasting 75 minutes. No disturbance followed.

The first case that came under my observation was a woman of 31, multipara, normal pelvis, 8 months pregnant, comatose, edema of extremities, albumen and casts in urine. Diagnosis, puerperal eclampsia. Cervix dilated with Champetier De Ribes balloon and in one hour expelled; immediately following I did a version and a normal child of seven pounds was delivered. Following the birth, the patient bled profusely and the Momberg was applied; no further hemorrhage. Examination showed 2 extensive tears of the cervix, one extending through the inner os, also a laceration of the clitoris and perineum. These injuries were repaired, placenta removed by Crède's

method, uterine douche of a 50% alcoholic solution given and the body having contracted nicely, the tubing was removed, patient put back to bed and no further trouble.

The second case, also reported by Sigwart. Woman of 24, primipara, normal pelvis, 9th month pregnant. Waters ruptured Jan. 14, 1909. Pains during next two days and on Jan. 16th child born at 9 p. m., delivery normal, weight 7½ pounds. Very small hemorrhage, no after pains. Uterus massaged but placenta was not expelled. Patient put to bed, ice bag over pubes. Waited until next morning when a slow hemorrhage appeared, bright red, but which did not require immediate interference. After 13 hours from time of delivery, attempt was made to expel placenta by Créde, first without and then with an anaesthetic; no result, but hemorrhage continued. The bag of waters having been ruptured now 3 days, it was decided to remove the placenta by manual tension. Placenta was resting in right cornu firmly adherent. A terrific flood of blood followed the removal, ergotin was injected subcutaneously, large alcoholic douches given and massage constantly kept up, no results. The Momberg was then quickly applied and hemorrhage instantly controlled. First a few drops continued and finally ceased entirely. After a few moments a large clot was expelled, uterus contracted nicely and then another clot followed. The uterus now having become stone hard, the tubing was removed, patient put back to bed with an ice bag and no further trouble was met with. In this case tube was on 18 minutes only and while on the pulse became stronger, breathing was not interfered with, there was no after vomiting, stools and urine normal.

There is little danger of injuring the bowels of a puerpera by the Momberg as the main part of the bowels are high up and out of the way at this stage.

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Hofbauer	"	" "

FINAL REPORT OF A CASE OF BONE TRANSFERENCE.*

By DR. T. W. HUNTINGTON, San Francisco.

This case was presented to the Society after its completion some years ago, and was published in the "Annals of Surgery," volume 1, page 249, 1905. The purpose of this report is to show the final end result after a lapse of six years. The history of the case is briefly as follows:

In May, 1902, the boy, then six years of age, was treated at the City and County Hospital for acute infection, osteomyelitis of the tibia. The middle portion of the shaft of the tibia was completely destroyed. A strenuous effort was made toward reproduction of bone by leaving such shreds of the periosteum as could be identified at that time. Eight months later, the wound having healed, there was no evidence of bone regeneration. The leg hung flail-like and useless below the knee. After careful deliberation, I determined to supply the tibial defect

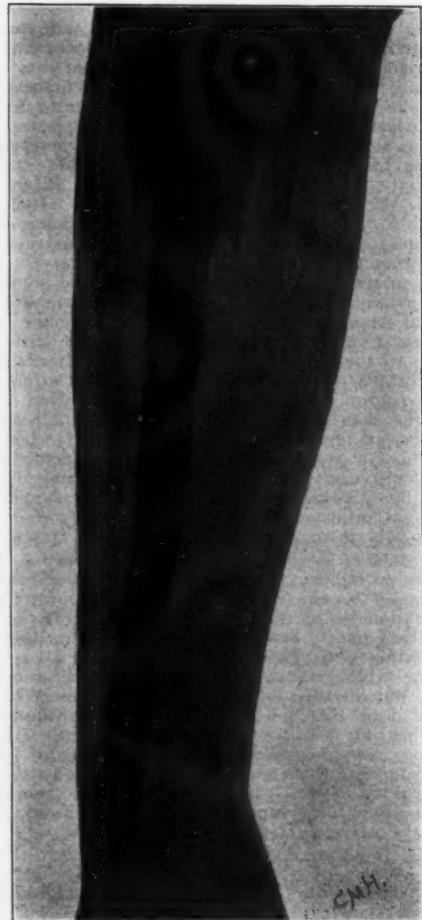


Fig. I. One-half life size.
Status eight months after first operation.

by carrying the divided end of the middle portion of the fibula across to the tibia, countersinking it in the upper remaining fragment of the tibia, thereby securing union.

The theory underlying this procedure was based upon the idea that with preservation of the normal nutrient supply of the fibular shaft, plus the exaggerated nutrition derived from the tibia, would result in rapid hypertrophy of the fibula in its new relation.

The result of the first operation was highly satisfactory and the patient was allowed to walk bearing his weight upon the lower end of the fibula in its normal position. At this time, there was manifest hypertrophy of the shaft of the fibula. (See plate 1). Very soon, however, it was noted that there was a decided lateral bowing of the foot upon the fibula causing a deformity. Accordingly, six months after the first operation, the fibula was again divided at a point opposite the upper end of the lower segment of the tibia. With little difficulty, the transference was completed (See plate 2). Again the wound healed kindly and rapid union was obtained.

* Read before the San Francisco County Medical Society, July 13, 1909.



Fig. II. One-half life size.

Status thirteen months after first and five months after second operation.

In six weeks, the child began to walk with little, if any, limp and in this respect, the patient's condition has improved, until, at the present time, he walks without a limp; runs as other boys do, plays baseball, football and in fact is walking upon a leg which is comparatively as useful as the other.

The accompanying radiogram (See plate 3) demonstrates that the theory underlying the procedure was rational, the transferred portion of the fibula now having assumed the dimensions of the normal tibia. Joint function at both knee and ankle remain perfect and there is but slight, if any, limitation of leg rotation.

In the "Annals of Surgery," volume 46, page 648, 1907, Dr. J. S. Stone reports a similar case in a boy of five years. He varied the operation by splitting

Fig. III. One-half life size.
Status six and one-half years after first operation.

the lower portion of the fibula at a point corresponding to the upper end of the lower tibial fragment. The inner slip of the fibula was carried across and anchored to the tibia and a satisfactory result was thus accomplished.

At the outset, there seemed to be reasonable doubt as to whether this procedure would be available for adults as it was for children. Dr. E. A. Codman, however, in the "Annals of Surgery," June, 1909, publishes the report of a case, the patient being thirty-two years of age. After three years, the radiogram shows marked enlargement of the fibula which may increase with the passage of time. Dr. Codman, however, transferred only the upper end of

the fibula and the patient maintains good weight bearing and locomotion conditions. It seems probable that if double transference had been done, as in the case above reported, the hypertrophy of the fibula segment would have been more rapid.

The foregoing cases, as far as has been ascertained, are the only ones that have been carried out upon this plan. It is to be hoped that others will report results of similar efforts.

Without personal experience, there comes to me the suggestion that bone transference, as herein described, would probably be available in the treatment of certain cases of long standing pseudarthrosis following tibial fracture, associated as is usual with eburnation of ends of fragments.

A CASE OF COMBINED TYPHOID AND MALARIAL INJECTION.

By H. SPIRO, M. D., San Francisco.

Mr. Smith, age 30, residence San Francisco. Complaint—Chills, sweats, fever. Family history negative. Past history, never sick, with the exception of several attacks of chills and fever in past three years.

He contracted the malaria while working in the swampy districts of Louisiana. He had taken several courses of quinin with good results, but after a time the quinin lost its effect on him, and seemed to make him worse, so in later attacks he has not used quinin. His habits are moderate, he denies all venereal diseases.

Present Illness:—Four weeks ago left Louisiana for this city; since leaving the south he has not felt right, although his appetite has been good and his bowels regular, still he felt listless and had repeatedly attacks of chills, sweats and fever; as he was getting weaker all the time, he finally sent for me.

I found the patient well developed, well nourished, intellect slightly dulled, reflexes normal, skin clear, spleen easily palpable, enlarged two finger breadths below the margin of the ribs, pulse 84, markedly di-crotic, temperature by mouth, 105, tongue slightly coated, otherwise findings were negative. The patient complained of pains in head and legs and begged me not to give him quinin. I diagnosed the case as malaria and ordered a calomel purge, also 20 grains of quinin every six hours; the next day temperature was 101. He had a drenching sweat the night previous, his bowels had moved several times and he felt better. I now ordered quinin 5 grains T. I. D., also Donovan's solution, 5 gts. T. I. D. I did not see the patient for four days; in the meantime he had no sweats nor chills, but was constipated and had severe headaches, his temperature was 103½, a distinct papular, pale red rash was scattered over chest and abdomen, his urine showed a positive diazo reaction; the Board of Health report on the blood was Widal positive; the diagnosis was now changed to that of typhoid fever, with the possibility of malaria also being present. He was removed to the St. Winifred Hospital.

The temperature curve showed the case to be in the fourth week of the fever. No more quinin was given, as the temperature gradually dropped he had several mild sweats but never any chills. At the end of the second week in the hospital, as the temperature seemed to be a little out of the ordinary the blood was examined and the Tertian malarial parasite found.

VACCINES.*

By PAULINE NUSBAUMER, M. D., Oakland.

This résumé is in part an answer to many inquiries made to Dr. Archibald and myself concerning the nature of the cases for which we have made vaccines and the results obtained.

To date we have made 95 vaccines; upon 39 of these it is too early to report; upon 14 we have no data—in several cases patients never returned, in some they died before the vaccine could be administered, etc.

This leaves 52 cases to be considered.

Organisms from which vaccines were made include *B. Coli. Communis*, *B. Typhosus*, *B. Pyocyanus*, *Micro Strepto- and Staphylococcus* and *Gonococcus*, either in pure or mixed cultures. In some of the sputum cases there were organisms not identified.

Case I. *Coli* infection—cystitis; much tenesmus in patient 72 years of age. After second injection, tenesmus relieved and marked improvement. A similar attack some time previous lasted much longer.

Case II. Pyelitis with colon infection, severe headaches and other symptoms, all of which promptly disappeared.

Case III. Patient 85 years of age; long standing nephritis and cystitis. Great alleviation of symptoms and pain after first injection; seven injections were given, covering period of two months. Patient died at 86 years of age.

Case IV. Cystitis, colon infection, requiring lavage several times a day with usual medication to make patient comfortable. Improvement immediate. After first injection, lavage unnecessary. Recovery.

Case V. Chronic cystitis. Colon infection yielded to none of the usual medicament; all symptoms relieved by vaccine, but it took a long time to clean up pus and colon bacilli.

Case VI. This case is unusually interesting. Man about 30 years of age; occupation demands that he be on his feet constantly. Some eighteen months ago he had an attack simulating appendicitis, and never quite well again. Later on had another attack, after which he had pain in back and right hypochondrum, frequent urination especially during the night, interfering greatly with his rest. Urine loaded with pus and gave a pure culture of *B. Coli Com.* Improvement after first injection of Colon Vaccine. Soon after returned to his work and reports himself well. He had about 12-16 injections.

Case VII. Perinephritic abscess, pus in urine, Case of long standing; by that I mean there was pus in urine long before abscess was found. Just what was found at operation I am not prepared to say, but after second operation wound did not heal well; culture from both wound and urine showed *B. Coli*. Improvement in this case was slow, but continued, and at last accounts I understand the patient reports himself well.

* Read before the Alameda County Medical Society.

Case VIII. Girl about 7-8 years of age. Pyelitis with colon infection of long standing, at one time desperately ill; finally, however, yielding to usual medicament; pus continuing in the urine and loss of control of urinary sphincter led to making a vaccine. No improvement, unless it be in the general health of the child.

Case IX. Chronic cystitis of long standing with colon infection. Symptoms yielded promptly to vaccine therapy, but as in Case V it took a long time to clean up the urine. Toward the last, injections were given one in two weeks. We have not heard from the case in months.

Cases of staphylococcus infections include furunculosis 2, endocarditis 1, infection of frontal sinus 3, wounds not healing well 7, acute infection 2, middle ear trouble 1, and a number complicating pulmonary tuberculosis.

First case of furunculosis was of some three months' standing. The physician in the case dismissed my inquiry with "Oh! that got well promptly."

On the second case we have but little data other than that the patient was doing splendidly.

The endocarditis case was a desperate one from the beginning, being complicated by the blood culturing being refused until too late, if that were possible. However, decrease of symptoms was so marked after each infection, that the patient was eager for the next one. In all, some 12 injections were given before the death of patient.

Of the three cases of infection of the frontal sinus, one, a man of some 50 years of age, had this trouble since boyhood, the discharge being so profuse that the handkerchief was needed every half hour; culture from discharge showed staphylococci. He began to improve after first injection, and now after some 16 reports himself well.

The second case was also a chronic one, accompanied by nasal discharge and constant severe headache. A nasal operation relieved the headache, but the discharge continued. Culture showed staphylococci. First injection of vaccine changed character of discharge and considerable improvement was noticed. The case coming to a standstill, another culture was made, this time giving both strepto. and staphy. Now, after about 12 injections in all, the discharge has ceased almost entirely.

The third case of infection of frontal sinus has had two vaccines made, but with negative results.

Case I of wounds not healing—a child supposed to be tubercular, this is of long standing—there were many wounds absolutely refusing to heal. The child was anaemic and bedridden. Swab gave staphylococci; a vaccine from same produced improvement after first few injections. And now, after some 12-16 injections, the child is up and around the ward, all wounds healed, good appetite, and as the nurses say, "Getting mischievous."

Case II. Man about 30. Sinus following operation; absolutely no benefit; patient gradually failing at last report. This was a T. B. case with staph albus and aureus.

Case III. Man shot in knee last November;

wound infected. Three amputations followed by an operation to give better drainage when wound finally seemed to be healing. Patient was then sent away to convalesce, but the wound broke down again. The surgeon here had to operate to secure drainage; discharged, examined, and vaccine made. Patient has received some 10 injections, and with usual surgical care has made a complete recovery.

Of the phthisical cases complicated with staphylococcus we can report on only 11. Of these 7 are markedly improved, 2 some improvement, 1 slightly, and 1 not at all. In one of the 7 cases a young girl, the cough was greatly diminished after first injection and the amount of sputum much lessened.

Of the 5 acute cases 1 has done well, 2 improved, 1 has gotten worse.

The case of middle ear trouble made a rapid recovery, receiving only two injections.

The third patient, also chronic, had two vaccines made with negative results. He had the benefit of drainage as well.

Of the three pyocyanus cases we have data on two only. One a diabetes patient with an infected arm, which refused to heal with the usual surgical care, improved with the vaccine.

Another infected arm, following an accident, made a splendid recovery. One, if not both of these cases, received the Bier treatment in connection with the vaccine.

A streptococci infection complicating pulmonary tuberculosis showed a marked improvement.

Another case of streptococci infection was in an arm of a patient who three months before had had empyema. This infection was extensive, but responded promptly to the Bier treatment and vaccine.

An infected hand did well; here drainage and vaccine only were used.

An infected finger in a syphilitic patient yielded to streptococci vaccine. Of course, these cases all received the usual surgical care, but the recovery was prompt; in some, if not all the cases, the surgeons felt that the vaccines played a large part in the good results obtained.

A case of infected hematoma in gluteal region gave a pure culture of streptococci. The case being a desperate one, antistreptococci serum was administered while vaccine was being prepared; the vaccine brought temperature down each time it was given, and unquestionably was a prominent factor in aiding recovery. A second culture showed staphylococci also, from which a second vaccine was made. The wound is still not closed, owing to the fact that it is healing by granulation. The destruction of tissue in this case was tremendous; there is an endocarditis as a sequelae. This case, like the others, received all surgical care.

All of our cultures of gonococci were contaminated with staphylococci.

In two of the chronic stubborn variety some improvement was noticed, but it is a question whether it was due to the vaccine or local treatment. One case has not improved at all, though it has hardly

had a fair trial since the vaccine was given irregularly.

One case of gonorrhreal rheumatism has done well, as has a case where the specimen for culture was obtained from wound following prostatectomy. This culture contained gonococci.

An acute case of gonorrhoeal rheumatism has also done well. So far we have only made one vaccine for the acute condition.

CRITICAL REVIEW.

Momburg's Method of Producing Ischemia of the Lower Limbs and Pelvis.

Hemostasis, by compression of the aorta, has long been known to accoucheurs, and ancient works on military surgery contain illustrations of the garotte with an abdominal pad. To Momburg, however (June, 1908), is due the credit of having simplified and made apparently safe a plan of rendering bloodless the lower half of the body, especially in view of operations on or near the hip joint and rectum.

The technic of Momburg's procedure is as follows: a rubber tube, two meters in length, and about one cm. in diameter, is wound around the body just below the costal arch. The femoral pulse should be tested at each turn of the belt, and just as this pulse disappears the ends of the tube are tied and held securely by means of a clamp. Habitually two turns will suffice to shut off the circulation in the femorals; additional turns may sometimes be required. Ischemia of the pelvis is obtained as follows: Esmarch bandages are first placed on the lower limbs, winding upwards from the toes; then the Momburg tube is applied and the Esmarch bandages are removed and the limbs lowered, thus causing the blood to flow from the pelvis into the limbs where it is retained by the reapplication of the Esmarch bandages placed high on the thighs. Under these circumstances the pelvis is practically exsanguinated. In normal individuals the application of the rubber tube for five or even ten minutes produces no discomfort.

August, 1909, Momburg found 34 reported instances of the use of his procedure; to these the reviewer can add ten additional cases (Wilhelms, Verhoogen, Riche, Faure, Lambotte), making a total of 44 cases up to September 15th, 1909. These cases comprise a variety of interventions—hip disarticulations and resections, thigh amputations, Kraske's operations, hysterectomies, etc. The average duration of the constriction was 32 minutes, the shortest 5 minutes, the longest 2 hours and 30 minutes. None of the patients complained of the constriction; some referred to the pinching of the skin of the abdominal wall.

Whilst the hemostasis was extremely satisfactory in all of the reported cases, it was absolute only at the beginning of the operation; within 10 minutes after the application of the rubber cord, some oozing and occasionally a small bleeding artery was seen, either anteriorly or in the gluteal region. This paradoxical hemorrhage is probably due to the collateral circulation through the mammary epigastric under the rectus and the ilio-lumbar, iliac-circonflex bordering the psoas muscle.

The study of the 44 known cases of Momburg's procedure brings out some very interesting observations, especially in relation to the evidence of compression of the abdominal aorta. All operators observed some transient circulatory disturbance at the time of applying the constriction. At first, the radical pulse becomes small, frequent (90 to 110) and sometimes irregular; after two or three minutes it almost always increases in ten-

sion and becomes regular. Upon removing the rubber tube the pulse again becomes irregular, more frequent and sometimes dicrotic. Within one minute or two, however, all is again normal.¹

The use of Momburg's hemostasis has never caused any motor, sensory, intestinal or urinary disturbances.² Unfortunately, the same can not be said in regard to the cardio-vascular system. In one case of Wilhelms, blood-stained expectoration was noticed, recalling a similar condition found in violent abdominal and thoracic compression (Perthes) and also in ligation of the thoracic aorta (Guinard, 1909, Katzenstein, 1905, Offergeld, 1907). Rimann and Wolff, assistants in Trendelenburg's clinic, recently reported two cases in which Momburg's procedure was the cause of exceedingly grave complications. In the first case, a Kraske's operation in an arterio sclerotic patient of 70 years, evidence of collapse appeared within a minute and a half after the application of the rubber tube, the pulse being imperceptible 3 minutes later. Pulsations returned, however, upon removing the band and the operation was completed without further trouble. In the second case, a patient free from cardiac lesions, application of the rubber tube was almost immediately followed by a fall in blood pressure (115 to 85); 2 minutes later the Riva-Rocci apparatus marked zero. Upon removing the tube the pressure rose to 80 and finally to 100 at the completion of the operation. In this instance, the patient remained three weeks in a serious condition of collapse, recovering with indisputable evidence of mitral insufficiency which could only be attributed to the use of Momburg's method of hemostasis.

The pathogenesis of the foregoing cardio-vascular complications has been considerably elucidated by experimentation. Hasenfeld and Romberg, in a series of experimental ligations of the aorta and vena cava, demonstrated the increase in blood pressure and the consequent faulty coronary circulation and even the possibility of paralysis of the heart. Rimann and Wolff, working on cadavers, showed that the Momburg tube compresses, at a point between the third and fourth lumbar vertebra, the aorta, the inferior vena cava, the inferior mesenteric artery and incompletely the inferior mesenteric vein, and the superior mesenteric artery and vein. Experiments with Momburg's tube on rabbits showed a sudden, variable increase in blood pressure, the maximum being obtained in about 25 seconds, the normal 6 or 7 minutes after the removal of the tube. Repeating the foregoing experiments on *laparotomized* rabbits, Rimann and Wolff found that compression of the aorta and inferior cava alone for a period of two minutes did not cause an increase in blood pressure, whereas if in addition to compressing these two vessels compression was made on the superior mesenteric artery and vein the marked blood-pressure phenomena noted in the previous experiments invariably occurred.

It would seem in conclusion that both clinical and experimental experience demand that the condition of the heart and blood vessels be most carefully scrutinized prior to resorting to Momburg's procedure. With this caution, there is sufficient reason for giving the procedure in question a more extensive trial. Its practical value in surgery and gynecology can only be determined by numerous additional observations at the hands of competent men. D. T.

¹ In view of avoiding circulatory disturbances Momburg advises elevating the lower limbs at the time of removing the rubber cord or gradually loosening the cord after having placed the Esmarch bandages on the lower limbs and loosening these slowly.

² There is apparently no relation between the urinary and rectal complications and the mode of hemostasis reported to in Pagenstacher's case (Archiv. f. klin. Chir., Aug. 1909).

MIXED INFECTIONS IN PULMONARY TUBERCULOSIS; THEIR VACCINE THERAPY.

By G. MARTYN, M. D., Los Angeles.

There never was a period when we could see so minutely into disease as we can now, and as time advances our vision will become more penetrating. One great fact is apparent to all clinical teachers, viz., the seriousness of a mixed infection, and in no domain of medicine is this more apparent than in pulmonary T. B.

Gorgo gives his opinion that cases of true mixed infection are those from the sputum of which a pure culture of T. B. cannot be attained; that is to say, the various organisms are inseparably associated. He regards those cases having various organisms in the sputum but from which true T. B. cultures can be obtained, as not true mixed infection, but rather incidental from bacteria in the air passages or from parts of lung not tubercular.

A case whilst in the early deposit stage of tuberculosis has few terrors, the lung shows little or no tendency to break down, but graft on to the initial infection one of streptococci and at once serious clinical symptoms supervene, high temperature and an evidence of breaking down lung tissue. I have confirmed Budder's experiment and found that cavity formation does not take place in a guinea pig's lung without it be inoculated with streptococci secondarily. It is a well-known fact that man and monkey are the only animals showing cavity formation in tuberculosis, the other animals showing a marked freedom from secondary infection, witness caseous rather than suppurative tuberculous foci in the cow.

Medicine to-day is an applied science, and through successful application of this science, has given us within the last few years a knowledge of the method by which invading bacteria affect the host and has developed principles of wide application in their treatment.

The process followed by nature in the cure of an infectious disease stands now to some extent revealed. It has been held that the study of clinical tuberculosis is essentially a study of the mixed infections, that in itself the T. B. is incapable of causing the symptom-complex of tuberculosis as we know it, and that cavity formation in particular is due to the action of the secondary infection.

In all cases of mixed infection the symptoms of toxæmia are very noticeable, especially if there is streptococci infection.

The periphery of a tuberculous area is, practically speaking, embryonal fibrous tissue. The function of these cells is to wall off the diseased area. Where there is a break in this wall of defensive tissue, the decomposition products and toxins gain entrance to the general blood current. Cornet found streptococci as far advanced in peripheral area of disease as T. B., and Ortner even further than T. B. in healthy tissue.

The flora of cavities consist of many variations of bacteria, pathogenic and saprophytic; of the pathogenic forms the different strains of strepto-

cocci are most important, and in my experience the presence of these organisms is of serious prognostic import; as a rule they are accompanied by high variations in temperature and rapidly breaking down lung. In two cases under my care quite lately in rapidly spreading miliary tuberculosis of the lung with massive involvement on both sides, this organism was found in the blood as well as in the sputum, cultures from the blood and from the sputum giving practically pure cultures, and I believe that all cases of miliary T. B. are accompanied by secondary infection. Kossel and Cornet have demonstrated them in miliary tubercles widely separated from the original forms, apparently showing that they entered the blood at the same time as the T. B., their progressively fatal course being due to this fact. One of these cases is interesting from the fact that this patient presented a clinical picture of uncomplicated T. B. on the right side. May, 1908, she had an attack of erysipelas of the face, starting from carious teeth. She recovered from this, but three weeks afterwards her temperature began to show great variations, varying from 100 to 103, with night sweats and chills; the sputum increased rapidly to a fatal termination. Streptococci are essentially organisms of decomposition, their soluble toxins producing the hectic symptoms.

Pneumococcus. This is a frequent secondary infection, far more dangerous in childhood than in adult life when complicating T. B. It is not of serious prognostic value in adults if present in small numbers. Cases complicated with pneumococci display a great tendency to develop pneumonic areas of consolidation very suddenly, with a high temperature and great discomfort. The clearest examples of this tendency I have seen in a case I have in care now; both apices are affected; his sputum generally contains a few pneumococci and T. B. in small numbers. He has improved under tuberculin immensely, but every now and again, generally through indiscretion, he gets a chill, and within forty-eight hours pneumococci increase at an enormous rate in his sputum, an area of consolidation appears of varying size, sometimes in one lung, sometimes in both. Evidence of this and inflammatory change remains for some weeks, and then he recovers his normal condition, clinical evidence of consolidation disappearing. One practical point apart from specific treatment, bearing this in mind, is to guard patients you know have this secondary infection very closely from sudden changes of heat and cold affecting profoundly as these do the vaso-motor centers. It is interesting in connection with this organism to consider its frequency in pleurisy and empyema complicating T. B. The organisms most commonly setting up these conditions are streptococcus, the pneumococcus and the T. B. Other organisms, such as staphylococcus, are quite rare. The relative frequency of these organisms differs very materially in children and adults. Sir Watson Cheyne's statistics show sixty per cent due to this complication in childhood and only twenty-five per cent in adults; indeed, empyema after T. B. pleurisy is four and five times as frequent in chil-

dren as in older patients. This seems to point to the fact that children's power of resistance is very low to pneumococcus, and indeed its frequent invasion of other parts of the body in childhood would seem to point to the same reasoning—witness peritonitis.

Staphylococci are frequently present, but seem to have little pathogenic significance, almost always of the albus type; they vary greatly in their morphology and bio-clinical reactions.

Micrococcus Catarrhalis—a large diplococcus. This in my experience is the commonest secondary infection and one productive of profound changes and clinical symptoms. Forty-three per cent of my records in mixed infection in T. B. are due to it, and this frequency is not to be wondered at when we consider that its habitat in health is the mucous membrane of the throat, and that it flourishes there, ever waiting if from any cause the body's material power of resistance be lowered, to become pathogenic. Ninety per cent of so-called influenza attacks are due to it, and the common cold is a result of its invasion more frequently than not. The toxins excreted by it are extremely virulent and soluble in the blood. I had the most convincing proof of this in my own person, having in error injected myself with an overdose during a cold; it produced the most profound collapse and my cardiac center remained irritable for a considerable time. Cases of secondary infection due to it have some special points of interest; the temperature ranges higher than with other organisms, a temperature of 103 being quite common. The sputum has a tendency to become very purulent and free, and on improvement it rapidly becomes mucoid. Chills and night sweats are frequent during the course of an attack. A typical case, well known to some present, showed all these points. When I first saw her the temperature was very high, around 103-104, profuse purulent expectoration, constant cough, great emaciation, both lungs heavily involved with large cavity in right; the micrococcus was the secondary organism, to which her opsonic index showed least resistance, and under vaccine treatment her temperature was reduced to around 99 within six weeks. Tuberculin was then commenced, and to-day she enjoys some measure of health and is able to enjoy many pleasures in life. The case was exceptional in the readiness it yielded to specific treatment.

Bacilli are of rare occurrence as a secondary infection.

B. Pyocyaneus. I have seen three cases in which this organism was a secondary and serious complication to T. B. Its presence is prognostically serious, its vitality being great, and the toxin produced by it is extremely toxic and soluble and so powerful. Two of these cases improved after a long tedious treatment, the third displayed no resistance (nor could I produce any artificial resistance) and became progressively worse.

Other more rare infections which I have only time to name, are *B. Influenza*, *B. Diphtheria*, *Pneumobacillus* and the large group of saprophytic organisms distinguished by their large size and ten-

dency to foetor. I have seen one typical case of the latter. The patient was a pig and cattle herder. Expectoration was profuse, the foetor being so marked that it hung to room and clothes. This case grew rapidly worse. Whether his occupation had any connection with the infection I am unable to say, but it is a fact that a majority of his pigs in Imperial Valley were dying of an ulcerative condition of ears and head.

You will naturally inquire as to means of differential diagnosis in cases where many of these secondary organisms occur in the same sputum. I am an ardent follower of Sir Abmroth Wright and his teaching. In my own hands the results have been eminently satisfactory and it has certainly given me a certainty in work I never felt before. I use the opsonic index entirely as a means of differential diagnosis, and my clinical results attest its value.

Sir A. Wright, in sending me his book "Studies on Immunization," just published, lays stress on the important significance of mixed infections in almost every field of infection and the immense help vaccine therapy has been. His results are the latest word, and in speaking of tuberculosis he says:

"Be it acceptable or unacceptable, there is no escape from the fact that practically every case of suppurating lupus is complicated by staphylococcus infection, and that the majority of aggravated cases of lupus are complicated by a streptococcus infection.

"What holds true of lupus holds true of the majority of tubercular sinuses."

Probuschky insists that in all cases of mixed infection the best results will be obtained from treating the secondary infection first before dealing with the T. B., and I think too much stress cannot be laid on this. Every day it is becoming easier to use exact laboratory methods, so do we get nearer to nature's own working.

No practice can be more superficial than the effort to lower temperature by drugs; nay, rather is it not becoming clear that high temperature is nature's protection against the activity of bacterial life. Pyrexia is, indeed, a normal reaction to toxic invasion, and a rise of temperature is as proper to certain diseases as a normal temperature is to health.

I would that I could go more fully into treatment, but time presses.

Shortly I use vaccine therapy almost wholly, growing the various organisms from blood and sputum in our own laboratory, and making homologous vaccines for each and every case. As a guide to dosage I mainly use the Index, but in some cases clinical symptoms are sufficient after initial finding. It may be of interest to you to know that work on precisely the same lines is being carried on at King Edward VII's Sanatorium, England, and in a letter I have just received from Dr. Bardswell, he speaks of the encouraging results they have had. At present it is the best and most scientific guide we have. In a field of such unusual difficulty as the pulmonary infections, even if one can only give some relief and comfort, that is something to have attained—at all events, the old feeling of impotence to aid is gone and in its place Hope shines.

SOCIETY REPORTS

CALIFORNIA ACADEMY OF MEDICINE.

Regular Meeting, January 26, 1909.

On the Injection of a Paste Containing Bismuth Sub-nitrate for the Cure of Tuberculous Sinuses and Cavities.

By SAMUEL J. HUNKIN, M. D., San Francisco.

Last February my attention was called in a private letter to an experiment of Beck of Chicago, who in an attempt to picture the ramifications of sinuses around an old tuberculosis joint, injected a paste of bismuth and vaseline and found to his surprise that the sinus closed on the filling. Some two weeks later Ridlon and Blanchard tried a series of experiments with the paste at the Home for Destitute Crippled Children and soon found that the experiments of Dr. Beck, while succeeding accidentally, was not an accidental success. Full details of experiments of Drs. Ridlon and Blanchard can be found in the American Orthopedic Journal for August. Two formulas have been used, the original one, known as No. I, consisting of bismuth sub-nit. one part and vaseline two parts, and used now only to determine the extent and capacity of the sinuses and cavities by a radiogram and paste No. II, with a formula of:

Bismuth Sub-nitrate	6 parts.
White Wax	1 part.
Soft Parrafin	1 part.
Vaseline	12 parts.

Each paste is mixed while boiling, solidifies upon cooling and is to be warmed when required. We have found that after it is heated several times, it separates or becomes granular, so it is convenient to heat for each seance only the required amount. It was the idea of Dr. Beck that some if not all of the success of the method was due to the radio-activity of the bismuth after exposure to the X-rays.

In the early part of March we began trying the paste in selected cases, and my first success was in an old osteomyelitis sinus, which after discharging for five years was closed by one injection. A similar experience has been since obtained in two other sinuses from old osteomyelitis. We did not have so decided a success in four tuberculous sinuses although in each instance the discharge was definitely lessened. I was at this time very careful of the kind of cases I tried it in and was timid about the force of injection. Upon the publication of the paper mentioned earlier, we began to use it more liberally, with more precision and in a class of cases which in the months before we had not thought of. Up to the present we have used it in eighteen cases with the following results. In all the discharge has at once markedly lessened; in the large majority practically disappeared. Temperature when present, has at once almost, if not entirely, remained normal, and this in cases where there had been a temperature ranging from 38° to 40° . In three instances of old osteomyelitis sinuses healing was prompt after one injection. We have had two healings in tuberculous cases after three and five injections, and in several

others, one or more sinuses have closed, although others remain with slight discharge. All of the cases except one have made a marked gain in appetite, color and weight. In one case an amyloid liver which reached down into the pelvis has now diminished until its lower border is two finger breadths above the umbilicus. We have injected it in cases where 3i filled the cavity and have pressed in 3viii before the proper tension was felt. Points learned with reference to the technic of the paste injections: 1st, white wax and soft parrafin are apparently not definite in character and consequently make a paste which varies in consistency and in solidifying point, the variation generally being a paste too soft and not getting hard enough at body temperature and consequently having a tendency to exude from the sinus. To remedy this at times we have had to increase the wax and diminish the vaseline. 2nd, it is advisable to use a blunt nosed syringe and inject steadily until some tension is felt. When other sinuses co-exist and communicate it is wise to watch the other openings until the paste appears and then plug them with a piece of gauze and continue the pressure until the desired tension is obtained so that all interstices are filled. Then remove syringe and clap a pad over sinus and then apply bandage, not attempting to clean away the reflex. 3rd, at second or any subsequent dressing if wound appears closed, it is wise to tease open the thin film covering and see that nothing is pent up under pressure. We had a small abscess once in the scar by neglecting this. 4th, it may be safely used with these precautions when the sinuses are multiple, secondarily infected and giving a septic temperature. 5th, it is of value in the desperate cases even when the patient has amyloid degeneration by lessening number of dressings, preventing pain and controlling discharge and increasing appetite. 6th, it is of as much use in other sinuses as in those from tuberculous joints and judging from our experience is especially well adapted to sinuses in osteomyelitis.

We do not use the X-ray after the paste injection having at present no faith in the theory of Dr. Beck that the result is due to the radio-activity of the bismuth, after the absorption of X-rays. We admit however, that we have no evidence to combat the theory, save that our cases are doing well. So great proportion of our cases, however, have not healed in so short a time as in the list of Ridlon and Blanchard, but most of our cases were pretty bad and riddled with sinuses. We have substituted zinc oxide for the bismuth and find it has about the same appearance and apparently has a similar value. We believe its value is mechanical, supporting, filling and closing the spaces.

In this connection it may be of interest to call your attention to some work done by Dr. Sherman of this city some fifteen years ago when I had the honor of working with and under him. He devised a plan of filling the osteo-porotic tuberculous bone, the diseased joints, and the surrounding tissues with a paste or emulsion, having iodoform as the ingredient instead of bismuth, practically the chief differ-

ence being that no attempt was made at that time to get a material which was solid at the body temperature. I shall be interested to find now if prepared with the wax and paraffin if it will not subserve so useful a purpose.

To show the character of the cases treated would like to call attention to the following:

M. K.—Girl about six years old. Bad hip riddled with sinuses, septic, bad odor, abundant discharge, outlook bad. For six months has been running high temperature, average daily 38.4° , although on numerous occasions she has had temperature of over 40° . Injected first early part of November. Since that time once only has her temperature gone over 37.3° . Discharge has practically stopped, odor has disappeared. She has no pain. Appetite has increased and she has gained four pounds. All her sinuses are still open but only a few drops of serum exude and she is dressed only when we want to re-inject.

H. E.—Boy about ten years. Four sinuses around hip with profuse discharge. Amyloid liver reaching into pelvis, has been running a moderate temperature for over a year 37.5° to 38.3° . Has been having injections since early part of November. Has had no temperature rise since first injection—discharge at once practically stopped—certainly no less than 5% of what it was before. He developed a ravenous appetite, has good color and has gained two pounds.

I. D.—Girl ten years of age. Spinal case with large psoas abscess with profuse discharge, soaking pads every day. Child in good condition and running no temperature. Injected Dec. 1st. It took $\frac{3}{8}$ of paste before proper tension was secured. Discharge practically abolished. Dressing only when bi-weekly injection is made and then a few drops of sero purulent fluid with some paste reflux is found on the pad.

In office and clinic work the cases are of course not so bad but the results are similar. I think a remedy has been found which will shorten the convalescence of patients with diseases of bones and joints and I think the many children who run a profuse discharge and develop amyloid degenerations will be rare in the years to come.

DISCUSSION.

Dr. King (Marine Hospital): I have one or two cases of interest under my care at the present time. One is a case of tuberculous wrist. At the time I took charge of the ward he was receiving every week one injection of bismuth paste in vaseline, softened by heat at the time of injection. It did not harden much when it became cold and prior to the next injection it was as much as possible squeezed out, and fresh applied. I could see no results from it after a time, so switched the treatment to some other preparations and finally to injections of iodin and glycerin. The case now has no marked suppuration, there being a slight serous discharge. The next point is that a few days ago the patient called my attention to a fresh sinus breaking out on the back of his hand and with a little pressure the patient pressed out quite a little quantity of bismuth paste which had been in there for some months, acting as a foreign body and sloughing out. The sinus has since healed. In this case we did not get the pressure of which Dr. Hunkin spoke. Another thing in regard to the use of bismuth in large quantities is the danger of poisoning. I have always considered bismuth as perfectly innocuous but I have seen reported a case in which the large colon was injected with a large quantity of bismuth for X-ray pictures and acute poisoning followed.

Dr. Harold Brunn: I wish to ask if Dr. Hunkin has observed bismuth poisoning in any of his cases as a result of the injection of large quantities of this

substance. Bismuth subnitrate I know may show toxic effects when applied to raw surfaces. I recall a case seen six years ago, a woman with at least half the body burned on whom a bismuth and castor oil paste was used, she developed symptoms of bismuth poisoning, one of its characteristics being a distinct blueish line on the gums similar to lead poisoning. Cases of poisoning have been reported also by the use of bismuth subnitrate in X-ray work when large doses of an emulsion are given to outline the stomach or the large bowels. It seems that in these latter cases, especially injections into the bowels, poisoning is apt to occur.

Dr. Hunkin: In using these injections I have found it necessary to make a certain amount of tension in the sinuses so that all spaces leading from them shall be completely filled. Where there is a multiplicity of sinuses as there so often is, especially around the hip, if the fluid paste is allowed to run freely out of one sinus as it goes in another, no tension is produced and many spaces must remain free from the paste and often trouble results. So we watch the openings of the sinuses not being injected and as soon as the material shows we plug up that opening with a piece of cotton, repeating the process until all sinuses and spaces are full. When this is accomplished we get a definite feeling of tension in the syringe. We then wait, holding each opening plugged until the paste has solidified, some two or three minutes. It remains cold. When we re-inject these sinuses we do not try to press out any of the old material, in fact it is our endeavor to keep it in there. We re-inject the patients every four or five days and just inject enough until we feel the tension again. Once in a while one of the plugs will shoot out of a sinus on account of the tension while re-injecting, but we look upon it as an accident. What becomes of the bismuth paste I do not know. It probably remains as a supporting body and nature will take it up and carry it away. It is very much like putting in a silver suture or a nail into the bone. It does not matter to me what becomes of it so long as it heals up and stays in and does not have to be opened and taken out again. I do not think that it does anything beyond mechanically supporting the tissue. I do not think that tuberculous granulomatous tissue possesses much power for absorption. In quite a number of cases we have found that it has been necessary to add a little more wax than the formula calls for as the paste is a little too soft.

Plaster Models and Their Value in Clinical Pathology.

Dr. A. W. Lee, San Francisco, exhibited some plaster models of different forms of skin diseases, which he had made and colored. He urged the advantage of the more general use of such a method of preserving and recording the exact condition of skin lesions at different periods in their course. In this country especially, there is a great lack of this kind of work, while in Europe and particularly in Germany the method is much used and the records thus preserved are of untold value in reporting former cases and for use by students. The technique for making the mould is not difficult. Plaster of Paris moistened to the proper consistency is spread upon a cloth, then inverted over the lesion and allowed to harden. When hard and dry the mould is varnished. The positive is then made by filling the mould with plaster and turning it out when hard. Dr. Lee states that even these uncolored moulds preserve in a remarkably clear way the anatomical characteristics of the lesions.

Ankylosis of Elbow Treated by Murphy's Transplantation Method.

Dr. Emmet Rixford: The case is one of ankylosis of the elbow operated upon by Murphy's scheme by

transplantation between the bones of a flap of fatty tissue. The patient is a young man about eighteen years of age who had an infective arthritis of the elbow which after discharging for a good while finally healed up and resulted in complete bony ankylosis. When the boy came to me it was three years after the infection and the X-ray showed an absolutely complete bony ankylosis. There was no movement possible and furthermore at the time of operation it was not possible for me, although I tried, to determine where the humerus left off and the ulna began; the radius was also adherent though the union between the radius and the humerus was not complete. There was a little film of cartilage in between. There was the least suggestion of rotation. The operation was performed through a posterior incision a little to the radial side. Section was made of the olecranon with a thin chisel, carving out the lower end of the humerus and taking away enough bone to leave room for a pad of tissue about $\frac{1}{4}$ " thick without the tension of the structures leading from the arm to the forearm making great pressure on it. Then the olecranon was wired in place and the wire was left in. This operation was performed on the fourteenth of November, 1905, complete primary union resulted and the plaster splint was removed after ten days. Active and passive motion was kept up without particular pain. The result at the end of a year is shown by the accompanying photograph, there being two exposures on the same plate. I got this little scheme of taking the two exposures on the same plate from Stimson, but found that by fixing the humerus on the table a much more accurate estimate of the angle of mobility is obtained than when the arm is simply held at the side as in Stimson case the forearm moving in front of the body. The rotation is about two-thirds of the normal. I got a letter from the young man some three years after the operation and he said that this arm is as good as the other arm for all purposes for which he needs it and he is a blacksmith. There are various operations for ankylosis of joints which are legitimate. Resection is the classical operation and gives excellent range of flexion and extension but the power in extension is deficient so that the patient cannot raise his hand above his head. I had one man who had had both elbows resected for tuberculosis who earned his living driving a milk wagon. The operation of resection can be greatly improved by thinning down the lower end of the humerus and putting around it a flap of the anterior capsule of the joint. In this way you can even get a good deal more power of extension as a result of this resection of the elbow. A flap of soft parts laid on the end of a bone seems to prevent the bones growing. I think this operation of Murphy's is much more satisfactory in that it appears to give a much better arm.

Discussion.

Dr. F. Dudley Tait: I would like to ask why Dr. Rixford refers to the interposition of muscular or fatty tissue in a joint as Murphy's operation. This was written of extensively by the Germans five years before Murphy; and two and a half years later Nelaton reported his operative findings, giving full credit to the Germans. About five years ago I saw two of these cases and conversed with Nelaton about his results. Nelaton never got more than 35 to 40 degrees of improvement in his cases and this case which Dr. Rixford has presented shows about 90 degrees. It is an excellent result.

Dr. Raymond Russ: I have performed this operation on two ankylosed elbow joints, both tubercular. In my first case I found the bones so brittle that it was handled with great difficulty and my patient was not materially benefited by the operation. In my second case conditions were more favorable and

I succeeded in improving considerably the function of the joint. I have examined quite a number of patients on whom this operation has been performed but have never seen such an excellent result as Dr. Rixford presents to us to-night.

PROCEEDINGS OF THE ALUMNI ASSOCIATION OF THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF CALIFORNIA, FEBRUARY 15, 1909.

Dr. L. S. Schmitt gave an interesting talk on the History of the Epidemic of Bubonic Plague in San Francisco with the presentation of excellent lantern slides.

Dr. Raymond Russ reported two cases simulating carcinoma of the stomach.

Report of a Case of Melanotic Sarcoma of the Toe.

By Douglass W. Montgomery, M. D., and H. M. Sherman, M. D. Demonstrated at the meeting of the Alumni of the Medical Department of the University of California, Feb. 15, 1909.

Dr. Montgomery's remarks: A woman, thirty-six years of age, consulted me December 2d, 1908, on account of a growth on the under surface of the third toe of the left foot, that she, because of its dark blue color, had considered a dilated vein. As a dark spot had existed there from childhood she had got used to its presence, but, nevertheless, during the past year it had decidedly enlarged, and finally she had determined to seek advice. This enlargement consisted in a superposition, that looked like an additional story on top of the original elevation.

The tumor was the size of a large pea, very prominent, lobulated, smooth and of a striking dark bluish color. It was soft, evidently incorporated in the skin, and freely movable on the subjacent tissues. There was no pain or other subjective symptoms. Near the tumor there was a speck in the skin, of the same color as the large tumor, and resembling a tattoo mark. This, the patient said, she first noticed about a year previously. The appearance of this satellite growth, for it was such, and the above noted increase in size of the original tumor, had occurred about coincidently. The affection was evidently a melanotic sarcoma, that had developed out of a naevus; its color, its rounded shape, its increase in size, its throwing out of a satellite, and its situation on the planter surface all agreed exactly with what is known of such growths. The left groin and the neighborhood of the left saphenous opening were carefully palpated, for enlarged lymphatic nodules, but none was found. The estimate of the nature of the tumor being made an immediate amputation of the toe was advised.

After amputation of the toe, Dr. Geo. D. Culver and Dr. H. E. Alderson studied the tumor from the point of view of its microscopical anatomy. It is a spindle celled melanotic sarcoma. Such tumors when occurring in the skin almost always develop from naevi, and this accords with the patient's statement that she had a dark spot in this situation from childhood. This fact together with their painlessness and the slowness of their development in their early stages, is full of fate for the patient, for long association deadens vigilance, and there is at first no pain to urge the necessity for action, so that the stealthy onset of these tumors is unnoticed or unheeded. An exception to this rule is melanoma of the choroid, for it early disturbs vision by interference with the delicate structures in the eyeball, causing blindness. These patients early seek advice, and prompt enucleation of the eyeball gives

a remarkably clean extirpation of the tumor, with a correspondingly good prognosis.

It has been proposed to group all the pigment bearing tumors whether sarcomas or epitheliomas into one class called the melanoma. Such a course has very little in its favor. The classification of tumors according to the fundamental tissue of which they are composed is more in accord with their natural history and tends to keep our ideas of them clear and sharp cut. Furthermore, although the formation of melanin is so strikingly a feature clinically, yet on narrowly examining such tumors it will be seen to be wholly subsidiary. In this tumor, for instance, and it is a good example of its class, only a very few of its cells are associated with the formation of melanin. Almost all the cells are colorless, having no coloring matter either in or around them. The metastatic growths, also, from such neoplasms are sometimes entirely white, and sometimes entirely black, and sometimes particolored, white and black. In the same organ one can find all three kinds of metastatic tumors, white, black and particolored. The fact is that the pigment in these cases is formed in the connective tissue cells that are called chromatophores. Chromatophores are connective tissue cells that lie just below the epithelial layers of the skin or retina, and have the property of elaborating black or brown pigment. They send out long processes from their cell body along which the pigment is carried. These pigment bearing processes then extend up between the basal epithelial cells, depositing the pigment in and between them.

The chromatophores in the skin lie well up in the upper layers of the corium and in the papillary layer, where they can most readily supply pigment to the epidermis. In accordance with this, we see in this tumor, most of the black cells in this situation, but in far greater abundance than normal. Curiously enough, however, although a superabundance of pigment is found in the tumor itself, no pigment is present in or between the epithelial cells lying over the tumor, where we would expect to see it in the natural course of its evolution. This absence of pigment in the epidermis may be due to the foot being covered, and as the stimulus of light is absent, no pigment is attracted into the epithelial cells; or it may be that although pigment is formed in abundance, it is not physiologically perfect, and therefore not fitted to finding its way to the epithelial cells. This last would be perfectly in accord with what we know of tumor cells; they divide and multiply with great rapidity, but physiologically they are incapable of performing their appointed work.

It is therefore found that in this tumor as in most melanotic sarcomas, the neoplasm springs from an organ in which chromatophores are normally present, and that these chromatophores participate in the growth of the tumor giving it a peculiarly striking appearance, but not really constituting the majority of its cells. As therefore the tumor is not formed either wholly or for the most part of chromatophores it is inexpedient to give it a name, such as melanoma or chromatophorma, that indicates that it is wholly or preponderately composed of chromatophores.

Dr. H. M. Sherman's remarks: In removing the tumor which Doctor Montgomery has described, the question arose as to how wide a removal of tissue was necessary—a priori the patient's expectation of non-recurrence or of no metastases would be the greater the more of the possibly implicated tissues were removed. Of course the whole toe should be removed, but should the foot be sacrificed? If this be answered in the affirmative, would one not have to decide the same as regards the leg or the thigh? Really an amputation planned to be at a higher

point than the most traveled migrating cell, must be at the highest point at which an amputation can be done. As a hip joint amputation could not offer absolute immunity from secondary tumors the subject was never broached, nor was anything ever said about thigh, leg or foot amputations and for the same reasons. The toe was taken off and with it its metatarsal bone and a long narrow wedge of integument and soft tissues on the dorsal and plantar aspects. This was as far as I decided to go.

The removal of regional glands was considered and decided against. The regional glands in this instance were in the groin. If they were implicated, so must be all the tissues between the toe and the groin, and the removal of the glands would be unnecessary or useless. If they were not implicated there could be no point in removing them. I felt for them carefully and also examined the pelvis contents while the patient was anesthetized, but could detect no sign of glandular enlargement.

SAN FRANCISCO POLYCLINIC GATHERING.

Regular Meeting, June 9th, 1909.

A Case of Hodgkin's Disease.

By Dr. E. Schmoll, San Francisco.

The patient's age is 29. She entered the clinic two months ago with the following history: She had been a waitress in dance halls and had been drinking heavily. She denies any specific or gonococcus infection. About a year ago she had an attack of delirium tremens and when she came out of the attack she noticed that above the clavicle she had a gland that was enlarged. This is the place where the first glands are usually seen. This gland increased very rapidly in size and at the same time she began to feel the glands in her axilla. The principal growth has been on the neck and the glands have reached a tremendous size. When admitted to the hospital she was in very bad shape. She had involvement of the mediastinum. There was edema of the hands, more on the left side than on the right and she had considerable difficulty in breathing. She had stridor with respiration, the respiration increasing to 30 and 35. Physical examination found all the glands of the body swollen, principally those which you see at present and the glands under the axilla and the inguinal glands. The spleen was enlarged sufficiently so as to be just palpable. The blood examination showed rather strange conditions. There was not very much anaemia, the hemoglobin was 85 at the time of the blood count, there was a leucocytosis of 18,800 and a differential count which is different from the usual counts. In the majority of these cases we have a leukopenia between 4000 and 6000 with a relative lymphocytosis. In this case we had a leucocytosis amounting to 89% polymorphs and mononuclears amounting only to 10%. These cases belong to the type of lymphosarcoma,—the malignant form of Hodgkin's disease where the capsule of the gland has been broken through. The glands in the neck are adherent as well to the skin as to the underlying tissues and the glands can be palpated singly or found in the form of large packages. The patient improved at the beginning under treatment of injections of atoxyl and the mediastinal pressure evidently retroceded, the anaemia disappeared, the dyspnoea decreased and there was no further increase in the size of the glands. X-ray treatment was taken up but was not continued because of the difficulty in getting the patient to the place of X-ray treatment. The symptoms have increased, the pressure on the trachea has increased and the patient has been very miserable. Doctor Gibbons has written an extensive article, a valuable contribution to

our knowledge of this subject, and he has consented to demonstrate some slides this evening and to say a few words on the pathology of Hodgkin's disease.

DISCUSSION.

Doctor H. W. Gibbons, San Francisco: This case is most interesting to me particularly from the point of view of classification. Clinically the tumor of the neck presents some aspects of malignancy, that is: the apparent solidity of the mass and involvement of adjacent structures. Also histologically there are aspects of malignancy. Therefore is Hodgkin's disease malignant in its nature? Reed in 1903 in an extensive study of seven cases came to the conclusion that Hodgkin's disease is an inflammatory process producing lesions analogous to the granulomata. His work was seconded by Longcope and Simmons. In a pathological study of nine cases which I made about this time the conclusion was reached that Hodgkin's disease should be classed with malignant tumors. W. B. Coley from his clinical studies supports this view. Adami in his textbook admits of no grounds for classing this disease with tumors, and Longcope in his article in Osler's system adheres to the view that the disease is of an inflammatory nature. We have in Hodgkin's disease an affection principally of the lymph glands which may involve in other organs. The glands first show a proliferation of the lymph cells at the centers of the follicles. The anatomical structure of the gland is early lost and the resulting picture is one of a mass of large lymphocytes of the character of those found at the germinal centers. At the same time there is a proliferation of the endothelial cells which line the lymph follicles which lie along the trabecular and under the capsule. These endothelial cells produce large cells of epithelial character which may leave from one to ten or more nuclei. These constitute the giant cells first described by Virchow, and which Reid determined to be characteristic of Hodgkin's disease. She traced their development from the endothelial cells lining the sinuses. This picture constitutes the soft variety of Hodgkin's disease. The hard variety shows a picture quite different although it is only a stage of the same process produced principally by the development of fibrous tissue at the expense of the cellular elements. Sections prepared from a cervical gland removed from this case show a typical picture of Hodgkin's disease of the hard variety. The structure of the gland is entirely destroyed, there is a marked proliferation of the endothelial cells with the formation of the characteristic giant cells, there are many eosinophiles and there is a marked increase in the connective tissue of the capsule, trabecular and reticular. In places the thickened capsule shows invasion with tissue of the same appearance as that of the interior of the gland. The lymphocytes are scarce. Myotic figures may be seen in the endothelial cells, in the giant cells and connective tissue cells but none in the lymphocytes. No author to my knowledge has found them in the lymphocytes so that the process seems to be confined to the fixed tissue cells and not in the wandering cells as one would expect in an inflammatory condition. On the whole the histological picture at least is very suggestive of malignancy and I think in time it will be shown that Hodgkin's disease is related to the sarcomas perhaps through that little understood group of tumors, the endothelioma. Doctor Brunn has asked whether I find different types or different pictures from different parts of the same tumor or whether one is likely to find the

same histological picture right through in different pieces from different parts. This is an important question. In an inflammatory disease advancing by progressively affecting different glands or organs, one would expect to find in the older lesions a fibrous type and in the newer lesions a more cellular type. Most authors describe this progression and believe the lesions in the internal organs to be growths arising from lymphoid tissue, previously existing in these organs, and not in the nature of true metastases. Ribert, however, believes them to be metastases caused by growth or transmission along the lymph channel. In the cases I have studied, the uniformity of the lesions from different parts of the body in the same case, was quite striking. A lymph gland will show a certain type and the metastases in the liver, spleen, lung will show the same type even in the small, apparently young, nodules. This is much the same in the glands from different parts of the body, and even the small glands at the periphery of mass of enlarged glands presents at a very early stage of its involvement a picture of similar type to that of the mass itself. As far as one tumor mass is concerned, one finds areas which are more cellular and areas where there is a great predominance of connective tissue but a general type prevails so that there is more difference than one sees in various parts of certain sarcoma.

Bullet Wound of Head.

Doctor Barrett, San Francisco: We had hoped to have had radiographs of this case to show you the error that can be made in the diagnosis. This patient is 35 years old, family history negative, about 3½ weeks ago had been attending some of the dance halls and while intoxicated was robbed of all his money and clothing. He became despondent and shot himself with a revolver. He brought it, he says, pretty close to his temple with the muzzle directed well forward. This must have been true for he was not at any time unconscious and was able to walk half a block, although he was bleeding considerably. Because of the loss of blood, slight pain, and his hysterical condition he cried out for help and the officers who found him sent an ambulance for him. He was taken to the Emergency Hospital and the wound probed; he was examined carefully, the history taken and two sutures put in the wound of entrance with a small drain. There was no wound of exit. He was then sent to one of the hospitals in the city where three radiographs were taken, and it was decided from the radiographs that the bullet was somewhere in the frontal lobe. The patient had experienced no pain except on the second day when there was a feeling as of a hard lump on the forehead and some tenderness upon pressure over it. There was a large hematoma extending well up on the scalp, in the center of which examination showed a harder area which was thought to be bone. After being in the hospital for some time and showing no symptoms except an alleged loss of vision in the right eye and discharge from the right ear the patient was transferred to the City and County Hospital. Doctor Callnow, our interne, made an incision under local anesthesia and extracted the bullet from the frontal bone where it was imbedded. It is presumed from the history which we read at the hospital where he had been that the presence of the hematoma or the focus being incorrect caused the error in the diagnosis because it certainly looked as if the bullet was behind the bone. The patient says his vision is worse in the morning and improves in the afternoon. We were unable to determine any definite disturbance of vision. The bullet had been thought by two or three who examined him to be a piece of bone rather than the bullet itself and even when cut down upon it was so flattened as to

CALIFORNIA ACADEMY OF MEDICINE.

Regular Meeting, June 29, 1909.

Reports of Two Cases of Head Injury Followed by Mental Disturbances.

By PHILIP KING BROWN, M. D., San Francisco.

The first case illustrates more pointedly the change in disposition in a man whose frontal lobe had an injury and secondly the influence upon this man of a moderate use of alcohol. The history was as follows:

Patient male, 42 years of age, engineer. Had had an injury to the head after which the wife noted mental disturbance. At the time of the injury in a train wreck eight years before the skull was fractured, both legs broken and the arm taken off. He was ill in the hospital nine months and delirious for four months. The injury was on the forehead over the left eye and discharged for four months. The wife states that there is a loss of memory, an incoherence of activities, amnesia, irritability, insomnia, nervousness, jerkings in sleep and loss of weight. Prior to the accident patient had always enjoyed good health. Patient complains of no headache although his wife says that he rubs the left side of his head sometimes. His mental condition had always been extremely good, patient never drank nor smoked prior to accident. Occasionally had taken whisky but without any effect whatever on the mental condition. While the patient was in the hospital after the injury and during delirium he broke out of the window and was only brought back with difficulty; it is not known what precipitated this special outbreak. The wife states that he has shown signs of forgetfulness to an increasing degree since he left the hospital. He would start to go downtown but could not recall afterwards what he went for and where he was going and on going out of a building did not know which way to go home. He began to be less tidy in appearance, to swear, to drink and to show signs of increasing irritability, a single glass of beer would increase these symptoms so much that he would not know where he was for a day nor could he remember anything he did. He has been recently confined for three months in an asylum and while there has been violent at times. This followed an excess of alcohol. There never have been any convulsions. During the past eight years he has complained a good deal of insomnia. His eyes were examined by Doctor Redmond Payne who found nothing. Doctor Payne suggested that the frontal sinus had been infected, and he advised a radiogram which, however, showed nothing. The patient was operated upon by Doctor Walter B. Coffey and spicules of bone $\frac{1}{2}$ " long, almost all around the scar, and projecting into the brain were removed. Ten days after the operation patient stated that his mind was more clear than at any time for years, that formerly where he had remembered nothing and would do things without remembering them afterwards he was now perfectly clear as to his actions. He stated that some change had occurred in his brain to make his life seem like starting anew.

Case No. 2—This case illustrates the uselessness of operation after lapse of too much time and onset of indications of permanent brain change (epilepsy). Patient, male, age 33. He complains of a dazed condition of his mind. Has had four generalized epileptic convulsions. Some eight years ago had an injury to the head since when he is indifferent to his work and has a happy go lucky air which he says is not normal to him. Is easily affected by alcohol and for that reason has not taken anything for years, although he has the appearance of one who drinks. Patient has always enjoyed good health

up to the accident to his head; this occurred by being hit on the head by a flat car from which a 4x4 beam projected; at the time he says he was not badly hurt, but his wife noticed that his speech was wandering. One year ago patient had a severe general epileptiform seizure without warning. Since then he has had three or four others. Since the first seizure the mental condition has grown worse. Examination reveals a scar over his right forehead and evident depression of the outer plate of the skull. Tenderness over the left parietal region near arm center, twitching of thumb and index finger of right hand. There were no eye symptoms and no involvement of the cranial nerves, he has a silly smile and the manner of a man under the influence of alcohol, but what was striking was the serious desire of the patient for relief and the evident recognition of all his failings. Doctor Coffey performed the operation for relief of the probable depressed fracture over the frontal lobe. There was no relief and he became so foul in his talk and so profane that he had to be sent to the Detention Hospital. From there he was removed to the City and County Hospital where the motor area on the other side was trephined and a thickening on the dura removed by Doctor Terry. Surgically he made a good recovery but his mental condition grew worse and he became violent and a few weeks later he was sent to the Mendocino State Hospital where he was fed with a stomach tube as he refused food and medicine. Three months later he died without having improved.

Report of a Case of Fracture of the Sixth Spinal Vertebra, Treated by Suture of the Cord. Death on the Sixty-seventh Day.

By T. W. HUNTINGTON, M. D., San Francisco.

My interest has centered, during the past few weeks, on a case of fracture of the sixth spinal vertebra which came under my care April 24th, 1909.

The patient was a robust man, age forty-four, living in a remote part of the state. Family history and past history, negative. He had been actively engaged in business life and was an unusually strong man.

On April 24th, 1909, he was rolled beneath a wagon in such a way that his forehead struck the ground, his body being forced backward over his head. Fifteen minutes later, he was picked up by friends. He realized from the outset that the lower portion of his body was paralyzed. The local doctor found total paralysis of the body from a point two inches above the nipple line. The paralysis involved the anterior muscles of the arm and forearm, there being slight movement of the deltoid and posterior muscles of the forearm. The intercostals were paralyzed and respiration depended upon the diaphragm. Sense of heat and cold were absent throughout the affected area.

I saw him first on the 26th of April and verified the above observations. At this time, his muscles were uniformly flaccid, although the sphincters were not relaxed. There was inability to evacuate the bowels and bladder. Pupils were normal in size but entirely stationary. The head was freely movable in all directions by voluntary effort including rotation. Patient resented any effort at traction of the head upon the spine. The following reflexes were manifest at this time, the patellar, cremasteric and ankle clonus. A Babinsky was manifest bilaterally. The patient was placed upon a rubber water mattress and was left in charge of Dr. T. G. Russell, who preceded me to the case. The conditions remained stationary for one week, when he was brought to this city after a three day's journey, arriving on the 5th of May, 1909.

Upon his arrival, he was seen by Drs. Kerr, Newmark, Terry, Russell, Cooper and myself. An X-ray

taken by Dr. Cooper showed a double fracture of the body of the sixth vertebra. There was no evidence of fracture of the spinous process or of the laminae, nor could any deformity be discovered by palpation at this point. During the following five days, the case was carefully gone over from every point of view and the possibility of total division of the cord or of compression was fully discussed. My own feeling was that the patient had sustained a complete division of the cord at the time of injury, but there was disagreement upon this point.

An operation, for the relief of possible pressure, was undertaken on May 13th, 1909, in which I was assisted by Drs. Terry and Russell. Full ether anesthesia was well borne throughout. A vertical incision over the spinous process of the sixth cervical vertebra was made and the cord was easily exposed by a double laminectomy. On opening the spinal column, the first thing that attracted my attention was a transverse, slightly lacerated tear through the dura. Through this opening, a probe dropped readily to the bony structure behind and when moved laterally, met with no resistance until the lateral pillars of the dura were encountered. Dr. Terry thought that possibly some portions of the lateral columns of the cord remained intact, but I had no evidence of it. The cord was then sutured with two very fine chromocised catgut mattress sutures. These were passed directly through the dura, posteriorly and anteriorly to the cord and through the cord itself. When the sutures were tied, the approximation of the cord and dura seemed almost perfect. Wound closure was by the tier method and resulted in rapid, ideal healing. For the next week or ten days, the patient remained apparently as he had been prior to operation. At the end of two weeks, there was evidence of failure which was continuous to the time of his death on June 30th, 1909.

The first thing that attracted our attention after the operation was the exaggeration of some of the reflexes, notably, the patellar reflexes. The Babinski was again manifest bilaterally. Nearly all the skeletal muscles were susceptible to the influence of irritation, and there was scarcely a single reflex in the lower part of the body which could not be elicited. There was, however, no suggestion of nerve regeneration over the paralyzed area. The presence of reflexes suggested to several of those who observed the patient the possibility that total division of the cord did not exist.

Upon this point, the findings of Goltz who, in 1896, published the results of extensive experimentation upon dogs are of peculiar interest. Goltz found that total division of the cord above the fifth cervical vertebra resulted in almost immediate death.

He, however, determined absolutely the viability of dogs from whom had been removed the entire spinal cord up to the sixth cervical vertebra. In some instances, dogs were kept living for some time after total destruction of segments of the spinal cord with a blunt instrument, the detritus being left in situ, but comparatively soon after such a procedure, toxic effects proceeding from the detritus, produced death; hence, it was found necessary to remove all the injured tissue and close the wound.

Under such a procedure, it was found that life could be maintained indefinitely. He found that the removal of the spinal cord was best done by a series of operations. In some cases, the spinal cord was

simply transected as high as the sixth cervical, but the procedure was less dangerous when the transection was at a point further back. When done at the third thoracic, the animals survived uniformly. Careful precautions were taken to secure absolute, complete section. This was done by lifting the cord out of the canal and dividing it in full view. The second step was taken after the wound had completely healed and the animal had regained strength. The vertebral arches were then removed from a definite area and the cord exposed. The proximal end of the cord was seized with forceps and the spinal end roots cut away to the lower point of section. Here, another cross section was made and the segment removed. Some weeks after complete healing of the second operation, another segment was dealt with in a similar manner until, finally, complete removal of the cord was effected.

After the last operation, the usual trophic disturbance occurred such as skin ulcers and blisters. Ultimately, these lesions healed kindly after extreme precautions.

Goltz's conclusions are briefly as follows:

First—Much greater danger to the life of the animal lies in the lowering of the blood temperature than in disturbances of nutrition; in fact, cutting of the *cervical* cord is always likely to be fatal when the body temperature is not maintained. For this reason, the animal was kept, after operation, in a sheet-iron warm-water jacket, whereby normal temperature was preserved temporarily until later, when heat control was regained by the animal.

Second—After section of the cervical cord, the eyeballs sank deeply into the orbits, lids almost closed, pupils not much narrowed but were unresponsive to light. Voice, strongly changed, deep baying being replaced by weak, very high pitched tones. When taken from the water jacket for cleansing purposes, some of the animals were found to perspire freely, but this continued for only five or six days. Sweating was thought not to be due to super-heating for the head showed no trace of perspiration and breathing and circulation were normal. There was no lolling of the tongue and no dilatation of vessels of mouth and eyes.

A number of illustrations of the heightened reflex irritability of the spinal cord, after total division, are given as follows:

First—After extirpation of the whole cord, the reflexes were maintained temporarily. But the irritability of the skeletal muscles entirely disappears after some time has elapsed. The muscles lose their elasticity, become soft and flabby and finally, are transformed into strings of connective tissue.

The external sphincter ani regains its tone and does not degenerate, and the inference is drawn that in some circuitous fashion, the external sphincter is connected through the sympathetic and the central nervous system which is uninjured.

Second—The urine remained clear, free from sugar and albumen. At first, the bladder would become immensely distended without being subject to reflex evacuation. Gradually, this condition im-

proved. After some months, the bladder contracted spontaneously when stimulated by a certain accumulated pressure. The placing of a thermometer in the anus would cause bladder evacuation, but stimulus from a greater distance, as tickling of the foot, produced no effect.

Third—The cord, having been removed from a pregnant female, she brought forth normal young at full term; secreted milk normally at proper time.

Fourth—Vaso-motor changes could not be brought about by distant stimuli, but considerable adjustment to local temperature changes as shown by skin conditions, color, hyperemia, etc., was observed.

Several points in the history of the foregoing case of fracture of the spine with total division of the cord are interesting in connection with Goltz's experimental work. It will be remembered that the reflexes over the paralyzed area, though slight at first, assumed almost exaggerated activity during the two weeks following operation, but disappeared completely during the later days of the patient's life.

Sweating was noticed at the beginning, fixation of the pupils was constant throughout. The bladder and bowel conditions which followed were almost identically in line with Goltz's findings. Furthermore, there was rapid muscular degeneration after the first ten days. At varying intervals, there was a rising temperature to 102 to 105. Such an exacerbation occurred during the last two days of the patient's life. This can be explained upon no other ground than a toxemia proceeding from the spinal cord detritus at point of injury. Toxemia, as an almost inevitable factor in the conduct of cases where extensive lesion to the cord has been sustained, seemed strongly to negative the possibility of successful cord suture, because of the fact that death will probably ensue from this cause before a regenerative process can be established. This is particularly true where total division of the cord can be demonstrated.

Taking all the evidence bearing upon cord suture, it seems highly improbable that such a procedure can possibly be of any value. Operations for conditions depending wholly upon compression of the cord, however, seem to offer sufficient encouragement to warrant further effort along this line.

Discussion.

Dr. Harry M. Sherman, San Francisco: The interest in these cases seems to me to center a great deal upon the diagnosis that is made before operation is undertaken and it is made more acute by the contention of late years that concussion of the cord does not occur. An injury occurring with no obvious upsetting of the line of spinous processes being present a diagnosis could be made of concussion of the cord and then operation done at a later time if the concussion symptoms do not clear up. But operation early or late discloses some things that seem to indicate that concussion of the cord must occur in some instances. I recall a patient who fell backward over a little walk in a garden to a path beneath, a few feet below, landing upon the back of his neck. He had at once complete paralysis below the level of the fifth cervical vertebra. A few days later I was told that the paralysis had cleared up somewhat and then had supervened again

and at that stage I saw him. It seemed to me that he was having probably some hemorrhage producing pressure upon his cord and that the hemorrhage was extending up so that the pressure was getting very close to the respiratory center. I advised that the spinal canal be opened. We did this but the man died upon the operating table. I went on and removed that portion of the cord which was supposed to be implicated in the crushing and found that it had been a perfectly good spinal cord, there was no evidence of any injury to it, there had been no pressure upon it and the whole picture had to be changed in my mind. He must have had a concussion of his cord for while there was fracture through the body of a vertebra there was no displacement and no fracture of the laminae; as further evidence that he must have had concussion of his cord is the fact that the concussion symptoms were abating, sensation was returning and he had regained some power of movement. The symptoms which I thought were those due to the hemorrhage and secondary pressure were undoubtedly symptoms of an ascending paralysis and the man was in articulo mortis and he would have died just the same without intervention. This experience is not unique for I have heard and read reports of other cases in which laminectomies have been done on a diagnosis of a crushing of the cord and at operation the cord has been found to have been untouched. I think there is much testimony to offset the claims of those who say that concussion of the spinal cord is practically never seen.

Another case which was watched by Doctor Newmark and myself was that of a young man riding on a lumber wagon. He fell from the wagon and was caught on the back of his neck by the axle as he sat upon the road and forcibly flexed. He remembered very distinctly that after having been left he stretched his feet out and then all power of motion disappeared. He was in St. Luke's Hospital when Dr. Newmark saw him with me and upon that one symptom we held our hands and did nothing in the way of operation. The symptoms were those of complete separation of the cord in the mid dorsal region and he had a slight kyphosis but because he had been able to move after the accident we let him wait. He was ill for a number of weeks and had bed sores and all the symptoms going with section of the cord, but he recovered perfectly. Two years after I saw him racing after my carriage to stop me on the street and tell me how he was.

CONTRA COSTA COUNTY.

The Contra Costa Medical Society met at Dr. W. S. George's office in Antioch on July 11th, 1909. After the routine business was finished, Dr. George F. Hanson addressed the meeting on "Some Thoughts in Therapeutics," it being the custom of the society for two years past to get some man of note to address them, which they have found very beneficial, both in the way of acquiring knowledge and in getting the members out.

The following resolutions were unanimously passed:

"First, Resolved, That it is the sense of this society that we shall add the feature of Medical Defense to the advantages of membership in the State Society;

"Second, Resolved, That we pledge ourselves in the writing of our prescriptions to conform as nearly as possible to the United States Pharmacopoeia and the National Formulary."

The next meeting will be held at Dr. Rattan's office in Martinez, September 12th, 1909.

FRANK RATTAN, Secretary.

NAPA COUNTY.

There was a meeting of the Napa County Medical Society on July 11th, at 2 P. M., at the Veterans' Home. Papers were read by Drs. T. W. Huntington, on "Intussusception"; R. Langley Porter, on "Valuable Therapeutic Measures Often Neglected When Dealing With Sick Children," and Emile Schmoll on "The Indications and Contraindications of the Use of Digitalis."

Dr. Huntington exhibited a femur, which had been fractured at the upper third of the shaft and had united by bony union. This specimen was of interest, as it showed the common displacement of the fragments. A case of abdominal aneurism in a man of 88 years of age was presented by Drs. Bulson and Reinstein.

Letters from Drs. H. Bert Ellis on "Ophthalmia Neonatorum," relating to a meeting to be devoted to the consideration of the same, and Philip Mills Jones on the "Matter of Undertaking the Defense of Our Members in Malpractice Suits." A motion was made and seconded that we obtain further information on this subject of "Malpractice Suits" from the secretary of the State Society.

Dr. Frank Farnum Abbott was elected a member of the County Society.

This was the first meeting of the County Society since January 7th, 1909.

ARTHUR HENRY REINSTEIN, Secretary.

SONOMA COUNTY.

The Sonoma County Society met in regular session on August 6th, at Dr. G. W. Mallory's office, Santa Rosa. There were only a few of the members present, who remained till 12:10 A. M. discussing medicine.

By motion it was agreed that the "delegates" had done a noble thing for the members of the Medical Society of the State of California in bringing to their attention the subject, "Physician's Defense," and that beginning January 1, 1910, the members of Sonoma County Society are willing to pay an extra dollar for the defense fund. There are four good reasons why the Medical Society of the State of California should establish a defense fund, namely:

First—It will unite the members and get them closer together.

Second—This defense clause will bring many able men into the County and State Societies. Thus all improve intellectually, numerically, morally and spiritually—medically.

Third—The plan not to pay judgments, but to employ counsel (the best) is a better method than that employed by some of the companies—defense—who agree to pay claims or judgments to certain amounts—\$1000 to \$25,000 for from \$10 to \$100 annually.

If a juror knows that a corporation will have to pay the damage he will be more likely to find the M. D. guilty; for the average juror has not much love for corporations, thus injuring the whole profession by holding one of its members a mal-factor.

Fourth—Truth is the foundation of every virtue. Medicine is founded on truth. We should be willing, if we, through lack of the truth, the knowledge, make a mistake which interferes with the lifework of a patient to pay for this lack. There's no excuse, for information may be had if we put our shoulders to the wheel and study and think—think.

This defense clause will give us the perfect ideal, as it were; each M. D. will have to answer for his own acts. The Sonoma County Medical Society is in favor of the defense clause being added to our State constitution. Our next meeting will be held at Eldridge, and Dr. W. J. G. Dawson will give us one of the best clinics our society has ever had.

The train will leave Santa Rosa at 2:45 P. M., and return at 7:10 P. M., September 3rd, 1909.

Dr. R. A. Forrest presented a paper, "A Month's Work in the Country." He detailed many cases like but very different from the following:

"Removal of piece of fine sewing needle in the ball of the foot in a woman 35 years old. Constructing bandage placed about instep and ankle to control blood circulation. Local anesthesia produced by hypodermic injection of 2/5th gr. cocaine, at 3 or 4 points about seat of operation. Incision 5/8th inch long, 1/3 inch deep by side of point of greatest discomfort. Foreign body invisible to high magnifier. Body removed by curetting thoroughly its supposed location. Although this alleged foreign body was never found, the proof of its removal could not be denied, from the fact that the operation maneuver employed gave perfect satisfaction to the patient. The result was a speedy relief of all symptoms. This mode of procedure was deemed preferable to the 'do nothing' treatment, which at times would be justified in cases where an operator would be working in the dark in dangerous locations, without the aid of the Roentgen Ray. The X-Ray in this case would be useful as a last resort. But in patients whose means are somewhat limited, we are bound to see that they are saved as much expenditure of time and money as possible. A piece of steel, if allowed to remain in the tissues, may do great harm; it may get entangled in fascia or tendons in the neighborhood of joints or it may become the center of suppuration ending in its expulsion. It may cause general infection or tetanus."

Dr. Forrest said in treating a case of diphtheria that he gave anti-toxin to patients in 5000 units 12 hr. after he had given 3000 and the 17-year-old girl recovered in a few days. He also gave immunizing doses of 500 to the attendants.

Dr. R. Bonar on discussion thought that owing to the idiosyncrasies that are found, have been found, he would rather take the chances of the other children getting diphtheria than to give them the immunizing dose of anti-toxin and run the risk of spasms, etc.

Adjourned at 12 o'clock.

G. W. MALLORY, Secretary.

BOOK REVIEWS

Review of Some of the Recent Advances in Tropical Medicine, Hygiene and Tropical Veterinary Science. Supplement to the Third Report of the Welcome Research Laboratories at the Gordon Memorial College, Khartoum.—Balfour and Archibald.

Attempting to review a review is a good deal like trying to make a word picture of a dictionary. The careful work of Balfour and Archibald in thus collecting between two covers the gist of the more recent advances in Tropical Medicine, Hygiene and Tropical Veterinary Science comes as a pleasant relief in these days of medical tautology and reiteration. Although written "with special reference to medical sanitary and veterinary work in the Anglo-Egyptian Soudan," the work contains much of interest to sanitarians, both of the tropical and temperate zones. The reviews of the recent literature on dysentery, enteric fever, paratyphoid fever and plague will especially commend themselves to the medical profession in California. The book is well bound and is printed in clear type on good paper. There is a surprisingly small number of typographical errors. Great judgment has been shown in the collection of sound practical papers so as to present in small compass the most important recent discoveries in the subjects treated.

R. B.

Righthandedness and Lefthandedness, with Chapters Treating on the Writing Posture, the Rule of the Road, etc. By George M. Gould, M. D. 1908. J. B. Lippincott Co.

In this book Dr. Gould has collected a number of articles which he had contributed to various journals, and has provided the collection with an introduction. The title will, no doubt, attract readers and purchasers, for some degree of curiosity must be general about what will appear to most people as a mystery. Gould quotes Carlyle as saying that the question of the origin of righthandedness is "not to be settled and not worth asking except as a kind of riddle," and he dissents from Carlyle both as to the importance of the question and as to the possibility of answering it satisfactorily.

The author enumerates nine theories of others and dismisses them with scant courtesy. His own theory is that "righthandedness originates in righteyedness." Movements are performed under ocular control. "Physiologically, therefore, the reason why an infant puts forth the right hand to grasp objects is because the right eye is the one which is nearest perfect visually, anatomically, or optically. . . . Heredity has place in the creation of the more nearly perfect right eye. . . . If the left eye of the infant is the better seeing eye it will grasp at objects with the left hand and become left-handed."

This statement of his theory is preceded on another page by references to the repetition of the phylogeny in the ontogeny, to habits and customs of savage men in warfare and barter. "All that is needed to explain righthandedness in 94 per cent of children is some ancestral savage custom, habit, or necessity, widely prevalent, which inclined to the use of the right hand and eye for one or two exceptionally intellectual tasks. The inheritance of aptitude, the force of custom and the necessity of the struggle for existence would certainly fix the persistence of the peculiar excellence."

In another place we are informed that "heredity has directly nothing whatever to do with the existence of the 94 per cent of righthanded and 6 per cent of lefthanded." If we understand Dr. Gould, he says that although "sign-language, warfare, etc., first originated the habit of righteyedness and so of its resultant, righthandedness, and this necessitated the location of the speech-center in the left half-brain," yet if a certain child's left eye happens to be superior to its right eye it will become lefthanded regardless of the "ancestral savage custom, habit or necessity," which is all that is needed to explain righthandedness in 94 per cent of children. Some testimony is presented relating to the general superiority of the right eye, but what is evidently needed to support the theory of lefthandedness is some facts concerning vision in the lefthanded. This seems to be an instance in which proving the cause of the exception would serve to explain the rule.

Speculation on such subjects readily provokes controversy, but controversy with Dr. Gould, a man terribly in earnest, would bring down much verbal violence on the head of his opponent. Dr. Gould disapproves of endeavors to cultivate ambidexterity and calls those who favor such endeavors "cranks," "sillies," "the most blunderful of stupid persons," and "deserving of more severe punishment than any other of our many criminally insane!" It is perhaps too much to expect him to be calm in the face of a world (or at least a profession) that contemplates with indifference or only more or less curiosity the phenomena of righthandedness and lefthandedness when Dr.

Gould tells us they "are the most serious of practical concerns, the source of infinite suffering, of innumerable tragedies and even suicides." One is reminded of Colonel Sellers in "The Gilded Age," who enforces his arguments with statistics on sore eyes in China, when Dr. Gould musters "20,000,000 patients with lateral curvature of the spine," "products of morbid visual function," "begotten by the schools." "In every school room of fifty pupils ten are scoliotics and at least twenty are also suffering from terrible and life-wrecking diseases caused by eye-strain." Whence is help to come in this dire need? "In Germany there is no scientific correction of ametropia. With one splendid exception our American students of the subject have usually adopted the European blunder," etc.

The world is out of joint. Oh, dreadful spite that none will learn from Gould to set it right. A book written by a man of temperament (and of temper), such as Dr. Gould seems to be, is not likely to be a dull one; and whatever fault may be found with the work before us dullness can not fairly be charged against it.

L. N.

Genito-Urinary Diseases and Syphilis. By E. G. Ballenger, M. D. Publishers, E. W. Allen & Co., Atlanta, Ga.

As stated in the preface of this book of 276 pages, the author has endeavored "to present fundamental principles, and to enter at the same time, into sufficient detail when considering matter of prime importance." The text is well arranged and the black and white illustrations, with few exceptions, are quite good. The latter are taken mostly from other works—for which due credit is given. The author, in addition to giving personal views based on experience, has also made a close study of recent literature from which he has drawn freely in his effort to bring the little book up to date. His conservatism is shown in his attitude toward bacteriotherapy. The efficacy of bacterins is affirmed and proper emphasis is placed on the fact that they are useful as adjuncts and cannot supplant other means of treatment. The chapter in which the spirochaeta pallida is described, is concise, and the best methods of staining smears are briefly given with three good illustrations showing the organism. It might be said that the book is too brief—but in this age of almost countless exhaustive publications this would be considered a virtue by the busy general practitioner or the harassed student. This work will prove of interest and value to both.

H. E. A.

Practical Obstetrics. By Grandin, Jarman and Marx. Fourth edition. F. A. Davis Company.

That four editions should be needed of this work on Obstetrics to meet the demand during the past fourteen years stamps it with approval as far as the general practitioner is concerned. The fact that more accurate, more extensive, more standard text books on obstetrics have been written during this period by more eminent American obstetricians than Grandin, Jarman or Marx, makes one wonder wherein lies the secret of their success.

The scientific foundation of the book is very weak, being entirely lacking in original work, and the ideas expressed, based as they are on the work of other men, are faulty in the extreme and lag far behind the modern point of view.

The book is profusely illustrated and contains many fine photographs of clinical obstetrics. Some could well be omitted, particularly the photographs of Grandin, with his fingers in the rectum of the

patient, "shelling out" the head over the perineum just prior to tying the infant's cord. The book is full of suggestions to the general practitioner which are probably of marked clinical value, but which often had better be taken *cum grano salis*.

While the book is not one to be recommended to students it can always be read by the practitioner with profit and often with amusement.

A. B. S.

Radiant Light and Heat and Convective Heat. By W. B. Snow. Scientific Authors' Publishing Co., New York.

Dr. Snow states in his preface:

"It has been the writer's purpose in the preparation of this little volume, as far as possible, to make it a practical aid to beginners in an important department of physical therapeutics, in which, if he has succeeded, he will be rewarded for his efforts."

Dr. Snow has undoubtedly succeeded in his purpose; his book is concise, complete and not too technical and, as he states in the preface, suitable for beginners.

His clinical reports are not highly exaggerated, as we often find in books of this character, and the small details of the methods of treatment are particularly well given.

In short, the work is a good epitome of the subject and well worth the perusal of any one interested in this line of work.

D. F.

The Principles of Pathology. By J. George Adami, M. A., M. D., LL. D., F. R. S., Professor of Pathology in McGill University and Pathologist to the Royal Victoria Hospital, Montreal; Late Fellow of Jesus College, Cambridge, England. Volume I: General Pathology. Illustrated. Lea & Febiger, Philadelphia and New York, 1908.

From the publication of Virchow's great work on Cellular Pathology until very recently morphological studies have dominated pathological investigation almost to the exclusion of all other methods. For years pathologists concerned themselves with the discovery of new lesions, and in giving precision to the morphology of old ones; in gathering statistics, exploiting organs of exaggerated size, and in general as Prudden has remarked, celebrating the monstrous and the strange. Fruitful as have been many of these researches the investigator of to-day, however, counts them "as but glimpses on the threshold of a domain in which his problems demand a recognition of the dominion in his own fields of universal physical and chemical laws, of the doctrine of evolution, and of the potency in single cells and in cell communities of hereditary traits and tendencies." Thus, in the added light of biology, physiology, chemistry, physics, anatomy, and of all the sciences ancillary to medicine the study of morbid processes has assumed to-day a significance impossible with the older methods of approach.

While this broader conception is manifest in much of the recent literature relating to pathology, textbooks on the subject have almost invariably disregarded it, so much so that they are little more than records of more or less crude morphological observations. The time has passed, however, when morbid anatomy and morbid histology may be regarded as

the sum and substance of pathological teaching, and when to name the tools is all that is to be demanded of the student. Although a knowledge of structural alterations is essential to a clear comprehension of some of the effects of altered function, in the future greater emphasis will have to be laid on the causes of disease and mechanism by which structural and functional changes are produced as well as upon the biological and physiological significance of the cellular reactions, if we are to impart to the student a knowledge which he can intelligently apply to his later clinical experience.

Noteworthy among those who have taken this position is Professor Adami, the author of the present System of Pathology. In that masterly article on inflammation, which appeared several years ago in Albutt's System of Medicine, he clearly indicated one of the viewpoints at least from which pathology may and should be presented. With the same philosophical conception he has attempted to present in this first volume the broad principles which underlie not only pathology but physiology as well. It is chiefly in this respect that the present volume differs from its numerous predecessors; instead of a mere account of various lesions, especially from the morphological side, Professor Adami gives in an orderly manner an analysis of the phenomena of disease.

Since the author, like the great master, Virchow, was forced to recognize the cell and the changes undergone by it as the basis of all pathological study he begins his book with a description of the cell from histological, physiological and chemical standpoints. This phase of the subject is very properly dwelt upon at considerable length while the biophoric theory receives adequate recognition in the discussion of inheritance in so far as it bears on pathology. The second section of the work contains a satisfactory, although in some aspects a rather summary account of the cause of disease, while the third and last section deals with Morbid and Reactive Processes, such as Inflammation, Immunization and Immunity, Regeneration, Neoplasms and Regressive Tissue Changes.

In a medical journal of this character it seems scarcely necessary to analyze the work in greater detail. Although some of the views advanced by the author are at least debatable, we have no hesitancy in expressing the opinion that this is the most logical presentation of general pathology which has ever appeared in any language. We suspect, however, that the treatment is somewhat too comprehensive for the average medical student of the present day; but as a work of reference it will unquestionably render signal service.

A. J. L.

The Principles of Bacteriology: A Practical Manual for Students and Physicians. By A. C. Abbott, M. D., Professor of Hygiene and Bacteriology and Director of the laboratory of Hygiene, University of Pennsylvania. Eighth edition. Thoroughly revised.

It has been some little time since the issue of the last edition of this always excellent book. There have been many new steps taken along this part of medicine. The author has taken up the most important and tried of these new advances, and brought his book up to date. He has also eliminated some of that which is of less importance. In this he is right, as this is one of the most important branches of preventive medicine as well as the one most subject to changes due to research and advancement. In other words, he aims straight at the useful and eliminates the others. The book is beautifully arranged, printed and bound.

H. R. O.

BOARD OF EXAMINERS, AUGUST SESSION.

Passed.

	Date of Graduation.	Percentage.
School of Medicine.		
Coll. of P. & S., Los Angeles, Cal.	6, 26, 08	77.2*
Coll. of P. & S., S. F., Cal.	6, 6, 07	83.6
Coll. of P. & S., S. F., Cal.	5, 19, 09	83.2
Coll. of P. & S., S. F., Cal.	5, 14, 08	78.2
Coll. of P. & S., S. F., Cal.	5, 21, 04	76.5
Coll. of P. & S., S. F., Cal.	5, 19, 09	75.7
Cooper Med. Coll., S. F., Cal.	5, 6, 09	89.1
Cooper Med. Coll., S. F., Cal.	5, 6, 09	87.2
Cooper Med. Coll., S. F., Cal.	5, 6, 09	85.8
Cooper Med. Coll., S. F., Cal.	5, 5, 09	85.2
Cooper Med. Coll., S. F., Cal.	6, 6, 09	85.1
Cooper Med. Coll., S. F., Cal.	5, 6, 09	84.8
Cooper Med. Coll., S. F., Cal.	5, 6, 09	84.4
Cooper Med. Coll., S. F., Cal.	5, 6, 09	84.3
Cooper Med. Coll., S. F., Cal.	5, 6, 09	81.2
Cooper Med. Coll., S. F., Cal.	5, 6, 09	80.1
Cooper Med. Coll., S. F., Cal.	5, 6, 09	79.5
Cooper Med. Coll., S. F., Cal.	5, 6, 09	79.3
Cooper Med. Coll., S. F., Cal.	5, 6, 09	79.2
Cooper Med. Coll., S. F., Cal.	5, 6, 09	77.4
Cooper Med. Coll., S. F., Cal.	5, 6, 09	76.9
Cooper Med. Coll., S. F., Cal.	5, 6, 09	76.4
Cooper Med. Coll., S. F., Cal.	5, 6, 09	75.8
Cooper Med. Coll., S. F., Cal.	5, 6, 08	75.0
Hahnemann Med. Coll. of the Pac., Cal.	5, 27, 09	81.0
Hahnemann Med. Coll. of the Pac., Cal.	5, -, 08	77.7
Hahnemann Med. Coll. of the Pac., Cal.	5, 21, 08	77.0
Hahnemann Med. Coll. of the Pac., Cal.	5, 27, 09	76.3
Oakland Coll. of Med. & Surg., Cal.	5, 27, 09	87.6
Oakland Coll. of Med. & Surg., Cal.	5, 27, 09	82.0
Oakland Coll. of Med. & Surg., Cal.	5, 27, 09	80.2
Univ. of Cal., S. F., Cal.	5, 11, 09	86.3
Univ. of Cal., S. F., Cal.	5, 11, 09	84.0
Univ. of Cal., S. F., Cal.	5, -, 09	83.4
Univ. of Cal., S. F., Cal.	5, 11, 09	83.2
Univ. of Cal., S. F., Cal.	5, 11, 09	79.7
Univ. of So. Cal., L. A., Cal.	6, 18, 08	86.5
Univ. of So. Cal., L. A., Cal.	6, 17, 09	85.5
Univ. of So. Cal., L. A., Cal.	6, 17, 09	83.6
Univ. of So. Cal., L. A., Cal.	6, 17, 09	83.2
Univ. of So. Cal., L. A., Cal.	6, 17, 09	82.5†
Univ. of So. Cal., L. A., Cal.	6, 17, 09	81.5
Univ. of So. Cal., L. A., Cal.	6, 17, 09	81.4
Univ. of So. Cal., L. A., Cal.	6, 17, 09	81.3
Univ. of So. Cal., L. A., Cal.	6, 18, 08	80.5
Univ. of So. Cal., L. A., Cal.	6, 18, 08	80.0
Univ. of So. Cal., L. A., Cal.	6, 17, 09	79.6
Univ. of So. Cal., L. A., Cal.	6, 17, 09	78.4
Univ. of So. Cal., L. A., Cal.	6, 19, 05	75.3**
American Med. Missionary Coll., Ill.	6, 16, 02	78.7
Baltimore Med. Coll., Md.	5, 21, 07	77.5
Barnes Med. Coll., Mo.	5, 14, 09	77.0
Cornell Univ. Med. Coll., N. Y.	6, 13, 06	83.1
Creighton Med. Coll., Nebr.	5, 3, 04	79.8*
Dartmouth Med. Coll., N. H.	2, 28, 99	88.0
Denver & Gross Coll. of Med., Colo.	5, -, 08	84.0
Denver & Gross Coll. of Med., Colo.	5, -, 09	79.7
Harvard Med. School, Mass.	6, 24, 08	82.5
Harvard Med. School, Mass.	6, -, 94	83.1
Harvey Med. Coll., Ill.	6, 25, 04	75.4
Jefferson Med. Coll., Pa.	6, 7, 09	81.3
Jefferson Med. Coll., Pa.	5, 15, 01	75.7
Johns Hopkins Univ. Med. Sch., Md.	6, 11, 07	81.5
Louisville Med. Coll., Ky.	7, 30, 08	80.0†
McGill Univ., Canada	6, 9, 05	84.9
McGill Univ., Canada	6, 12, 08	75.9
N. W. Univ. Med. Sch., Ill.	6, 4, 08	85.6
N. W. Univ. Med. Sch., Ill.	6, 14, 00	83.8
N. W. Univ. Med. Sch., Ill.	6, -, 09	83.0
Rush Med. Coll., Ill.	6, 1, 09	86.6
Rush Med. Coll., Ill.	12, 20, 06	83.5
State Univ. of Colorado.	4, 3, 08	81.3

Univ. of Bonn on the Rhine, Germany.....	4, 29, 09	80.3
Univ. of Buffalo, N. Y.....	5, 3, 96	80.9
Univ. of Ill.....	6, 9, 08	82.2
Univ. of Ill.....	4, 19, 98	81.7
Univ. of Iowa.....	4, 3, 01	83.1
Univ. Med. Coll., Mo.....	5, 16, 09	77.0
Univ. of Penn., Med. Coll., Pa.....	6, 19, 07	85.6
Univ. of Penn., Med. Coll., Pa.....	7, 02	82.4
Univ. of Penn., Med. Coll., Pa.....	6, 16, 08	79.1
Washington Univ., Med. Dept., Mo.....	5, 2, 01	82.1*

Failed.

Cal. Eclec. Med. Coll., L. A., Cal.....	5, 21, 09	72.3
Coll. of P. & S., S. F., Cal.....	6, 25, 02	73.0
Coll. of P. & S., S. F., Cal.....	5, -, 06	72.8**
Coll. of P. & S., S. F., Cal.....	6, 6, 07	69.2*
Coll. of P. & S., S. F., Cal.....	5, 22, 06	63.8*
Coll. of P. & S., S. F., Cal.....	6, 6, 07	62.5****
Coll. of P. & S., S. F., Cal.....	6, 25, 02	58.1
Cooper Med. Coll., S. F., Cal.....	11, 5, 08	69.2
Cooper Med. Coll., S. F., Cal.....	4, 28, 03	68.1****
Hahn. Med. Coll. of the Pac., Cal.....	5, 27, 09	72.2
Hahn. Med. Coll. of the Pac., Cal.....	5, 21, 08	71.8
Hahn. Med. Coll. of the Pac., Cal.....	5, 21, 08	70.9**
Hahn. Med. Coll. of the Pac., Cal.....	5, 27, 09	62.8
Hahn. Med. Coll. of the Pac., Cal.....	5, 27, 09	56.5
Univ. of So. Cal., L. A., Cal.....	6, 17, 09	73.6
Univ. of So. Cal., L. A., Cal.....	6, 13, 05	72.8
Univ. of So. Cal., L. A., Cal.....	6, 17, 09	70.8
Univ. of So. Cal., L. A., Cal.....	-, -, -	60.6
Hahn. Med. Coll. & Hosp. of Phila., Pa.....	6, 2, 09	67.5
Hahn. Med. Coll. & Hosp., Ill.....	4, 13, 90	60.5
Harvard Med. School, Mass.....	6, 29, 98	70.7*
Jefferson Med. Coll., Pa.....	3, 14, 92	72.4**
Jefferson Med. Coll., Pa.....	5, 2, 93	67.9**
Jefferson Med. Coll., Pa.....	5, 15, 95	49.8
Medico-Chirurgical Coll., Pa.....	-, -, 01	71.1
N. Y. Homeo. Med. Coll. & Hosp., N. Y.....	5, -, 05	53.0
N. W. Univ. Med. Sch., Ill.....	6, 16, 98	76.4
Rush Med. Coll., Ill.....	2, 19, 89	67.3*
Rush Med. Coll., Ill.....	2, 27, 85	64.5
State Univ. of Iowa.....	3, 5, 85	82.1*
State Univ. of Iowa.....	3, 12, 90	68.8**
Tokyo Charity Med. Coll., Japan.....	7, 31, 07	56.3
Trinity Coll., Dublin, Ireland.....	11, -, 63	91.2
Tufts Med. Coll., Mass.....	6, 12, 07	61.5
Univ. of Ga., Med. Dept.....	3, 3, 83	65.4
Univ. of Ill., Coll. of Med.....	6, 5, 09	71.8
Univ. of Maryland.....	-, -, 03	69.6
Univ. of Mich., Homeo. Med. Coll.....	6, -, 08	72.7
Univ. of Mich., Homeo. Med. Coll.....	6, 25, 91	63.1
Univ. of Minn.....	6, 11, 08	68.3
Univ. of Vermont.....	6, 22, 08	71.3
Vanderbilt Univ., Tenn.....	5, 3, 09	69.0

Osteopathy—Passed.

American Sch. of Osteop., Mo.....	6, 1, 09	85.8
L. A. Coll. of Osteop., Cal.....	6, 3, 09	80.6
L. A. Coll. of Osteop., Cal.....	6, 3, 09	78.0
L. A. Coll. of Osteop., Cal.....	6, 3, 09	76.8
L. A. Coll. of Osteop., Cal.....	6, 3, 09	76.0
L. A. Coll. of Osteop., Cal.....	1, 28, 09	75.6
Pac. Coll. of Osteop., Cal.....	6, 23, 09	82.1
Pac. Coll. of Osteop., Cal.....	6, 23, 09	81.7
Pac. Coll. of Osteop., Cal.....	6, 23, 09	80.1
Pac. Coll. of Osteop., Cal.....	2, 4, 09	75.7*

Osteopathy—Failed.

L. A. Coll. of Osteop., Cal.....	6, 3, 09	69.3
L. A. Coll. of Osteop., Cal.....	6, 3, 09	69.1
L. A. Coll. of Osteop., Cal.....	6, 3, 09	65.1
Pac. Coll. of Osteop., L. A., Cal.....	6, 23, 09	72.6
Pac. Coll. of Osteop., L. A., Cal.....	2, 4, 09	72.2
Pac. Coll. of Osteop., L. A., Cal.....	6, 23, 09	70.8
Pac. Coll. of Osteop., L. A., Cal.....	6, 23, 09	69.9

* Taken before.

† Subject to presenting evidence regarding college term and Latin.

NEW LICENTIATES.

Beach, E. C.; Beatty, J. D.; Boardman, W. W.; Bowles, F. H.; Boxmeyer, C. H.; Brinckerhoff, E. E.; Brostrom, E. E.; Brownlie, J. W.; Burtt, L. W.; Butt, E. G.; Cahen, C. G.; Carpenter, H. C.; Cohn, H. J.; Colloran, J. E.; Cope, J. H.; Cowan, J. R.; Crane, H. W.; Criley, C. H.; Cunningham, R. L.; Daggett, E. H.; Dakin, W. B.; Derham, V. C.; Drucks, E. S.; Duncan, R. D.; Ellis, M.; Fraser, D.; Glover, E. P.; Gowan, C. H.; Green, A. S.; Green, L. D.; Haight, L. L.; Hall, G. P.; Hamilton, G. Van T.; Hemphill, E. B.; Hill, W. B.; Hollister, J. C.; Jones, A. H.; Jorgensen, N.; Kaufman, B.; Kergan, J. F. C.; Kimbley, H. G.; Lawson, F. M.; Lord, C. E. D.; Lueschen, A. G.; McDonnell, C. H.; McKevitt, E. M.; McLeod, P. DeM.; McVey, C. L.; Magee, A. C.; Manatt, A. P.; Marsh, O. G.; Meyers, W. L.; Millar, P. A.; Morton, L. B.; Naffziger, H. C.; Nittler, A. N.; Nussbaum, A.; Parker, C. H.; Pearson, R. G.; Petch, P. H.; Plumb, C. B.; Prusch, N. H.; Reeng, J. D.; Reis, H. W.; Remington, L. D.; Rinker, C. L. A.; Rowland, P. D.; Sampson, W. A.; Savage, W. W.; Sawyer, E. H.; Scott, A. J., Jr.; Shade, M. A.; Shaul, J. W.; Shelley, H. H.; Slater, J. H.; Stewart, B. R.; Toogood, J. E.; Townsend, V. R.; Truman, A. W.; Van Allen, L. W.; Van Kaathoven, J. J. A.; Wallace, C. T.; Walsh, J. F.; Weeks, R. F.; White, M.; White, P. G.; Wolfe, H. H.; Wright, C. I.; Wrinkle, G. S.; Young, T. C.

In Error.

Dr. H. B. Reynolds' correct address is 627 University ave., Palo Alto, and not Redwood City, as published in September issue of the Journal.

CHANGE OF ADDRESS.

Briggs, L. H., from Fabiola Hosp., to Central Bank Bldg., Oakland.

Banks, W. H., from Stirling City (Butte County), to 4402 California st. (Richmond Dist.).

Preston, R. W., from San Francisco, to Mendoza City, Cal.

Riehl, F. W. F., from Alameda, to East Cambridge, Boston, Mass.

Delamere, H. S., from Ferndale, to South Berkeley Bank Bldg., Berkeley, Cal.

Hess, H. A., from Shreve Bldg., to 126 Stockton st., San Francisco.

Bennett, Laura B., from Los Angeles, to 977 Fell st., San Francisco.

Duncan, F. T., from Oakland, to 166 Geary st., San Francisco.

Pollard, Frank, from Caspar, Cal., to Garberville, Cal.

Haderle, J. A., from 628 Hayes st., to 297 Devisadero st., San Francisco.

Sawyer, W. A., from 2345 Telegraph ave., to 2434 Durant ave., Berkeley.

Newman, Alfred, from 1316 Sutter st., to 126 Stockton st., San Francisco.

Kellogg, W. H., from 924 Geary st., to 135 Stockton st., care Dr. G. L. Painter.

White, Carlos M., from Lindsay, to Visalia, Cal. Lichau, Ernst, from 1456 Sutter st., to 345 Stockton st., San Francisco.

Possley, Addison, from San Jose, to —?

Sheaff, P. A., from Santa Barbara, to 511 41st st., Philadelphia, Pa.

de Marville, H. B., from San Francisco, to 4 Rue Leonce, Reynaud, Paris, France.

Cohn, Robt. D., from 1316 Sutter st., to 126 Stockton st. (City of Paris Bldg.), San Francisco.

Keenan, A. S., from 24th and Mission sts., to Angelo Bldg., 16th and Mission sts., San Francisco.

Frick, D. J., from Delta Bldg., to Wright & Calender Bldg., Los Angeles.

Nelson, Lois, from 1836 Cedar st., to 1908 Virginia st., Berkeley.

Williams, Annie W., from P. O. Box. No. 13, to D and Spring sts., Hayward, Cal.

de Faria, J. B., from San Francisco, to 1304 8th st., Oakland.

Noble, J. Albert, from Oakland, to Elkan Gunst Bldg., San Francisco.

Reynolds, H. B., 627 University ave., Palo Alto.

Campiche, Paul, from 1705 Powell st., to 916 Kearny st. (Sentinel Bldg.), San Francisco.

Garceau, A. E., from 1380 Sutter st., to Shreve Bldg., San Francisco.

Conner, Ada Scott, from Santa Clara, to Garden City Bank Bldg., San Jose.

Wise, Philip L., from Los Angeles, to Ryland Bldg., San Jose.

Conner, A. W., from Santa Clara, to Garden City Bank Bldg., San Jose.

Heffernan, W. T., from Calexico (Imperial Co.), to —?

Smith Q. C., correct address is 4148 Center st., San Diego, Cal.

Taylor, A. H., 135 Stockton st., San Francisco.

New Members.

Pauson, Chas. A., San Francisco.

Vanderpool, Mary F., Hayward.

Bullock, N. H., San Jose.

Peek, Allan H., Palo Alto.

Richards, C. M., San Jose.

Sampson, Jas. H., San Jose.

Conner, Ada Scott, San Jose.

Conner, A. W., San Jose.

Wise, Philip L., San Jose.

Deaths.

Johnston, J. L., Los Angeles.

Coil, Mary F., Woodland, Cal.

McCollough, A. M. F., Los Angeles.

Wells, W. H., Sacramento.

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